Information Society in Palestine: The Human Capital Dimension

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Acknowledgements

My interest in the societal role of information and communication technology (ICT) is more than two decades old. It was at that time, in the early 1980s, that I first introduced a course on "The Sociology of Information and Communication Technology" at Queen's University. My research in ICT for most of this period has dealt with western societies - Canada in particular. This current project, however, completes the circle for me by connecting my long-established interest in researching the Middle East with my on-going work on advanced industrial societies.

It is an understatement to admit that researching an emergent country like Palestine is not an easy task, particularly when the data on a topic such as this are hard to come by. To its credit, the International Development Research Centre (IDRC) saw fit to support this research, which seems to belong more to the trendy scholarship of technological societies than to that of a third world country. I hope that this report will become a benchmark for future studies on ICT in Palestine.

Many individuals and institutions assisted in bringing this project to fruition. My thanks are extended to them all. Dr. Pamela Scholey at IDRC's Peace, Conflict and Development Programme must be given a great deal of the credit in facilitating this research. At Queen's University, Susan Marlin, the Associate Director of Research Services at the School of Graduate Studies, invested time and energy in shepherding the project during its crucial phases. My colleagues Rafal Rohozinsky and Deirdre Collings-Rohozinsky worked jointly with me in the early part of this project to formulate the research problematic of how to study Palestine as an information society. While this report focuses on the human capital dimension of ICT in Palestine, their work complements mine, and deals with the institutional and infrastructural aspects of ICT processes in Palestine.

Without the cooperation of local institutions and researchers in Palestine the project would not have accomplished its objectives. Foremost to thank is my administrator on the ground in Palestine, Mr. Thuqan Qishawi, who amazed me time and again with his skills at interpersonal relations and his ability to navigate the bureaucratic maze of local politics in Palestine to obtain information and access to key people. Mr. Luay Shabaneh, the Director of the Palestine Census Bureau of Statistics, gave generously of his time to answer questions about the PCBS national surveys on ICT, all of which were made available to me. Without this information it would have been impossible to carry out the demographic analysis of ICT in Palestine. Dr. Faisal Awartani, President of Alpha International, cooperated fully with me in ensuring the smooth running of the focus group interviews that were carried out by his Centre on behalf of the project. Dr. Mashhour Abudaka, Executive Director of the Palestine Information Technology Association, made data collected by his Association on Local Government in Palestine available to the project. Mr. Subhi Kayed, Director of Educational Technologies at the Palestine Ministry of Education and Higher Education, provided me with invaluable information about ICT use in the educational system. Mr. Ghassan Abdullah, of the Faculty of Law at Bir Zeit University, provided useful advice on information related to the legal aspects of ICT in Palestine. Ms. Enas Abu Laban and Mr. Habib Hazzan, members of the Palestinian Negotiations Support Unit, offered their expertise regarding the legal aspects of telecommunication policies in Palestine.

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As it is usually said on occasions such as this, any shortcomings of this report are mine alone, and all the positive contributions are the result of collective efforts of those who gave of their time and intellectual efforts to ensure the project's success.

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Executive Summary and Recommendations

The executive summary provides the thrust of the arguments that emerge from each of the report's papers. The summaries follow the order of the papers as they appear in the report. The executive summary is followed with a list of recommendations.

Executive Summary

Mark Warschauer

In this conceptual paper, and writing in the tradition of understanding the nature of social embeddedness of science and technology, Warschauer views information and communication technology (ICT) from a holistic perspective as a means to empower its users. The label "community informatics" is used to designate the reciprocal relationship between technology and the social surroundings. Community informatics, which seeks to apply ICT to help achieve the social, economic, political, or cultural goals of communities, is comprised of four elements: (1) physical resources, (2) digital resources, (3) human resources, and (4) social resources.

Warschauer notes that Palestinian dependence on Israel has serious ramifications for ICT use. Israel acts as the main hub for Palestinian access to the Internet. Any improvements in telecommunications infrastructure are contingent on Israeli approval and control. The Israeli occupation hindered economic development of the Palestinian areas and stood in the way of developing a consumer technology market, let alone technology production. At the same time, however, Israeli occupation acted as a catalyst for the Palestinians to turn to the Internet for empowerment and link with other diasporic Palestinian communities.

It is also the case, however, that ICT will not flourish in undemocratic environments, and where decision makers do not provide the needed impetus to spur technological developments. Palestine lacks sound ICT policies at the local and national levels.

The contribution of this chapter lies in pointing out the need to bypass the "digital divide" label, which has been used too often in discussions of ICT. The variety of means of access to ICT is not a binary, yes/no condition; rather, access can take place in different modes, depending on the extent of digital literacy, familiarity with the technology, and its social context.

In particular, Warschauer points out that the Palestinians suffer from digital illiteracy due in no small measure to limited access to computers and the Internet, where English is the main language of communication. A fuller appreciation of ICT in Palestine requires assessing diverse types of digital literacy.

Mohammed Waked

Aware of the shortcomings of using standard indicators when assessing the ICT landscape in a country, Waked turns his attention to both critiquing existing literature and recommending ways to deal with the specific, local conditions of Palestine. He reviews systematically the literature on ICT indicators as developed by international organizations and research centres, and finds them wanting. Basically, these sources and their funding agencies adopt universal indicators that reflect neoliberal and free market ideologies, and ignore the local constraints of a country such as Palestine. Thus, the drive to work within universal measurement instruments of ICT diffusion fails to render accurate "the different ICT stories for different countries." Moreover, rather than rely solely on quantitative measures of assessment, Waked points out the need to incorporate qualitative approaches so as to tap the nuances of the countries in question.

He proposes an ICT venue that reflects the various access modes used by Internet users, frequency of ICT use, and the experience of the user. These are important aspects to consider when developing appropriate ICT policies. Waked finds the approach adopted by the Palestine Census Bureau of Statistics (PCBS) in its survey of ICT in Palestine to be more sensitive to local conditions and capture issues that fall under the ICT venue.

By focusing on the role of occupation, Waked points out how Israel penetrates the Palestinian telecommunications market; controls entry of imported telecommunications goods and equipment to the territories; and limits the allocation of frequency spectrum and ISPs by controlling international calls that have to be routed via Israel. According to Waked, these should be part of the infrastructure matrix of indicators that are used to assess Palestine's readiness to join the information society.

Elia Zureik

In two separate papers, Zureik examines the human capital dimension of ICT through (1) focus group interviews with young Palestinians in 10 different locations in the West Bank, Gaza and East Jerusalem, and (2) analysis of a national survey dealing with the demographic and social correlates of ICT in Palestine. The focus group interviews provide in-depth assessment of the views and experiences of 124 interviewees drawn from urban and rural areas, as well as from refugee communities inside and outside the camps. The findings of this study underscore the points raised by Warschauer, namely that the social context must be taken into account to fully appreciate the use of ICT. It appears, among the purposefully selected group of interviewees, that there is widespread familiarity with computers and the Internet, but at the pre-college level the schools do not seem to play an active role in training students to use the technology. The skills acquired are more a product of "learning by doing" than the result of systematic hands-on instruction in schools. There is parental monitoring of Internet use at home, although it does not appear to exert a controlling effect on Internet and computer usage. The main impetus for using the Internet is the desire to establish contact with friends and family members. The fact that Palestinians live under occupation with restricted freedom of movement has made the communication technology indispensable. The cost of Internet connections was cited as the greatest deterrence against having Internet access. This explains the popularity of Internet cafés, youth clubs and community centres that are equipped with computers and Internet access. Several respondents mentioned the lack of fair competition in the telecommunications sector, and were fairly critical of the Palestinian carrier for its high subscription rates and unavailability of phone land lines in remote and rural areas. To remedy the situation, respondents suggested instituting fixed subscription rates for Internet usage, fashioned after television license fees. Finally, the most salient feature of Internet usage in Palestine related to issues of privacy, surveillance and monitoring by foreign governments – Israel and the USA in particular. This was cited in almost every focus group location. All respondents noted that privacy and secure information flow on the Internet are non-existent.

The second paper by Zureik focuses on the PCBS national survey of ICT. The broad national representation of the survey and its size (6779 households) allowed us to draw a comprehensive picture of ICT in Palestine. As members of an emerging third world country, Palestinians are increasingly orienting themselves to using computers and the Internet. The last five years have seen a 100 percent increase in Internet subscriptions; even so, the overall levels remain low, at no more than 10 percent of the population.

There are important regional differences in the use of computers and the Internet – differences that reflect the political economy of the Palestinian territories and dependence on Israel. From the human capital perspective, however, gender differences stand out as the most significant factor. Because of the traditional nature of Palestinian society and male dominance, geographic mobility and participation rates of females in the labour force remain fairly low. For these reasons, females do not possess anywhere near the same level of economic power as males, hence the disparity in the use of the Internet and access to ICT indicators. The gender divide appears to be taking hold as early as the teen years, even though the educational attainment of young females is not far behind males at this stage. This is particularly true with regard to the Internet and less so in the case of computer use where female rates are close to males'.

In spite of the economic deprivation mentioned above, cost is not perceived as the main reason for not using the Internet. Rather, lack of know-how and Internet availability (presumably for those who want to use the Internet outside their homes but cannot) are cited as the main reasons. These national findings appear, at first glance, to contradict the findings of the focus groups. This contradiction can be resolved by realizing that the focus group interviewees were already users of the Internet, and as such their complaints about cost had probably more to do with *frequency* of use, whereas for the general population it is the lack of know-how and availability of the technology, rather than cost per se, which appear to be the main inhibitors.

Education and occupational background, as anticipated, correlate significantly with ICT use. The higher the educational and occupational background of the respondent, the more likely it is that that he or she will use computers and the Internet. This was also true with regard to the ICT index, which encompassed five ICT indicators. Close to one-third of the sample cited Internet cafés and friends' houses as primary Internet access sites. Very few mentioned the school as a place where the Internet is used. Through a series of logistic regressions, the paper analyzes the determinants of telephone ownership, cellular telephone ownership, Internet subscription, use of Internet cafés, and computer ownership.

Irene Jillson and Rida Baidas

Jillson and Baidas provide an institutional discussion of the Ministry of Education and Higher Education (MOEHE) initiatives in fostering the use of ICT in the Palestinian educational system. The Five Year Development Plan 2000-2005 provided the basis for modernizing and reforming the educational system. The Plan accounted for the importance of human capital for national economic development, but the money allocated initially to ICT projects amounted to a miniscule 0.0002 percent of the total public education budget – a woefully inadequate sum compared to the needs of the school system.

The enormity of the task facing Palestinian policy makers is highlighted by noting that almost one-third of the Palestinian population is of school age. The MOEHE estimates that the school-age population will increase by 30 percent between 2001-2006, and university enrollment will triple. The preponderance of young people in the population, coupled with rampant poverty and high unemployment, has created a difficult task in terms of matching the country's needs with educational output. Deterioration in the educational system was reflected in decline in the proportion of full-time teachers, increase in the ratio of students to full-time faculty, and decline in basic school enrollment.

In a report issued by the MOEHE, 80 percent of government schools (numbering 1497 schools) include technology as a subject, but there are only 617 school computer labs. The ratio of students to computers stands at 102:1. Furthermore, computers are unevenly distributed across the country's schools.

At the university level, where the number of students tripled from 33,000 to 120,000 between 1995-2003, the teaching of ICT is not fully integrated in the curricula and remains concentrated in traditional science and engineering departments. In its 2003 report, the United Nations Development Program cited several reasons for lack of ICT in Palestinian universities. These included accessibility and support of ICT tools, funding, underutilization of facilities equipped with ICT, and weak linkages between the universities and the labour market requirements.

Nader Wahbeh

Wahbeh's ethnographic study of ICT in Palestinian schools is probably the most detailed study of its kind in the public domain. A survey carried out by the MOEHE in 2004 revealed that only 30 percent of ICT teachers have computer science background, 18 percent have additional math background, and 35 percent have natural science background. Only 21 percent of the schools are connected to the Internet. The methodology lends itself to examining attitudes and behaviours of students, teachers, parents, principals, and other stakeholders in the use of ICT in schools. The qualitative data were based on classroom observation and focus group interviews with students. To supplement the qualitative data, Wahbeh distributed questionnaires to teachers and students. This study focuses on the role of pedagogy in fostering enabling attitudes toward technology. He surveyed nine schools: private and public, refugee and non-refugee. He investigated the role of the community and the curricula, as well as beliefs of parents and ICT practices at home.

In studying the process of ICT integration in the schools, Wahbeh concludes that student ICT activities outside the schools have more impact than their school activities. This includes the gathering of information related to school work. Two-thirds of the teachers who are involved in ICT teaching have Internet access at home, compared to one-third of the students. Computers in schools are used for 45 minutes per week to teach computer skills. The uneven distribution of ICT in society generally and in the school specifically leads Wahbeh to conclude that instead of ICT having a leveling effect on society, it seems to be reinforcing class divisions. Similar to what we noted above, here too girls have lower rates of access to the Internet and computers than boys both at school and at home.

Wahbeh also discovered that teachers do not encourage students to use ICT. The teaching of technology in the classroom is undertaken with little regard to what students may already know about the technology. As well, there is no attempt to integrate the use and teaching of ICT with other school subjects. Parental attitudes have an inhibiting effect on student use of ICT. Between one-fifth and one-half of the parents did not see the utility of their children using the Internet. The proportion rises for parents of females. Parental concern reflected significant moral concerns.

Samer Faris

The story of the development of the telecommunications sector in Palestine is yet to be told in its entirety. Faris provides a start by focusing on the initial attempts to kick start this sector following the 1993 Oslo Agreement between the Palestine Liberation Organization and Israel. As was the case with other aspects (economy, polity, boundaries, etc.), the Agreement included detailed specifications regarding the mandate of the Palestinian Authority (PA) in the transition period until a final peace agreement is signed. Annex III of this Agreement, entitled Civil Affairs, deals with the telecommunications sector in the Palestinian territories.

Faris analyzes the repercussions of the relevant paragraphs in Annex III for the establishment of a Palestinian Ministry of Telecommunications, followed by an elaborate discussion of the circumstances surrounding the development of the Palestine Telecommunications company (PALTEL) as a private monopoly in charge of telecommunications in Palestine, and the role that Israel continues to play in constraining the development of a viable telecommunications sector.

As in other areas, Faris demonstrates that the Oslo Agreement did not serve the interests of the Palestinian public in this vital area. Internally, the Palestinian Authority embarked upon an expansion of telecommunications service to the public through cronyism. They also neglected to institute an independent regulatory body which oversees the operation of the telecommunications sector. After insistence by the World Bank, the PA agreed to set up an independent regulatory agency that oversees the telecommunications sector. So far, the Council of Ministers has not approved the blueprint for such a regulatory body.

It is extraordinary that the licensing agreement between the PA and PALTEL gave the latter a 20-year monopoly over the telecommunications sector, and provided PALTEL with a radio frequency spectrum that is free of charge.

For its part, the Israeli government continues to act with an iron fist by not allowing the telecommunications sector to grow, particularly in preventing the PA from establishing international connectivity on its own and controlling the overall spectrum management. Israel has also succeeded in blocking the PA's full membership in the International Telecommunication Union (ITU) (i.e., beyond observer status), even though the ITU has granted Palestine its own country code. As well, Israel rejected the PA's request when it approached Jordan and Egypt in attempts to establish through them international connectivity by means of fiber optics.

The Palestinian experiment in providing wireless service is quite limited in its geographic coverage since Israel remains in control of 70 percent of the West Bank, and has a monopoly over microwave relay towers located in Jewish colonies or under control of the Israeli army. This situation has given Israeli telecommunications companies the exclusive advantage to compete with PALTEL and compel PATEL to enter into an agreement with Israeli companies to provide international access to its customers, including the Internet service.

Badie Sartawi

One of the unintended consequences of Israeli occupation has been a trend of turning to the Internet and the World Wide Web to establish links between Palestinians within Palestine and Palestinians living outside Palestine. The various closures and curfews imposed by the Israeli occupation forces almost crippled Palestinian colleges and universities. Increasingly, they turned to the Internet to serve their students and carry out what amounts in several instances to distance education. It must be kept in mind, however, that the provision of distance education via the Internet is necessarily limited to those who have Internet access. As we have seen, no more than 10 percent of households have Internet access at home.

The technical paper by Sartawi provides a blueprint for a hands-on, operational web-based database that provides information on the programs of all colleges and universities. As of September 2005, the system provided information on all ICT and engineering courses offered by Palestinian institutions of higher learning. The system is intended to assist students in choosing their courses, and enable administrators in carrying out educational planning.

Although the will is there, Sartawi points out that institutions of higher education face tremendous problems in creating high-level graduates who are qualified to contribute to the labour market through their training. Training in universities is not geared to the needs of community. As well, there is shortage of qualified specialists in the areas of ICT. But the perennial problem remains that of funding.

Shannon Yurke

A measure of the interest that academics and researchers invest in any area of scholarship is the extent to which studies are published in the area. The case of ICT in the Middle East and North Africa (MENA) in general, and the Palestinian case in particular, is no exception. Yurke's stock-taking exercise accomplishes two things. First, it lists those organizations and their web sites that are funding or researching ICT in the MENA region. While not exhaustive, the list names close to 80 such organizations, covering governmental, international, and private sectors.

In addition, the bibliography consists of roughly 300 entries dealing with ICT in the MENA region. Most of these are available through the Internet. The project also provides an online searchable database using EndNote (bibliography database software). Users can thus both download from and add to the database.

Recommendations

1. Studies and surveys of ICT in Palestine should adopt user- and community-centred approaches. Replications of western and other methodologies in studying Palestine without taking into account the specific conditions of the society are not likely to create data that can feed fruitfully into policy formulations.

2. There is an urgent need to convene a panel of experts and practitioners representing various stakeholders within Palestine and outside it to discuss the development and adoption of suitable ICT indicators that reflect the reality of Palestinian society. These indicators should become part of the statistics that are collected regularly by statistical agencies at the local and national levels.

3. There has to be a closer link between the educational system and its capacity to train individuals in advanced technology so as to meet the requirements of the community and the labour market.

4. User-centred approaches to assessment of ICT necessitate paying special attention to the educational system and the manner in which technology subjects and training of students are carried out. Moreover, teachers must be trained to use technology for teaching purposes, and to impart concepts about ICT in the classroom.

5. In a society with nearly non-existent natural resources, human capital stands out as its main asset. It is therefore imperative that ICT be deployed on two levels simultaneously: first, to transmit applied skills to citizens (in the workplace, educational system, and society at large) to enable them to function in the 21st century; second, to tighten the network of Palestinians worldwide who reside as dispersed communities in exile. To do this, the dependency on Israel for ICT must be severed, particularly in terms of Internet connectivity.

6. In order to offset persistently high rates of unemployment and lack of mobility among Palestinians, it is important to encourage the creation of a virtual labour market in the form of electronic cottages where people can perform work from their homes and other satellite workplaces. Towards this end, it is important to carry out a feasibility study to examine what training is required to accomplish this objective.

7. A special campaign ought to be mounted to educate the general public – especially parents and teachers – about the importance of ICT to society. Special attention should be paid to improving the disadvantaged status of females. The home, educational system, and civil society should play leading role in this regard.

8. The glaring social and economic inequities inherent in Palestinian society impact the well being of society as a whole. In light of this, access to the Internet and training in its use should be facilitated by expanding access in publicly affordable, supervised, safe places like Internet cafés and community centres.

9. It is apparent from the findings of this report that the schools teach ICT in a traditional manner; students come in contact with computers and the Internet once a week for 45 minutes. Schools should provide access to computers outside the prescribed teaching time, and also provide guidance in the use of the Internet.

10. There is consensus that the Internet in Palestine operates under severe constraints imposed by Israel, whether through spectrum allocation or in allowing Palestinian Internet operators to provide international connectivity to users. This, however, is no reason to stall the implementation of a code of fair practices in conformity with international standards, or the development of the long-awaited independent regulatory body that will oversee the telecommunications sector and protect the public. As well, the sooner the monopoly of Internet service provided by PALTEL is opened up for competition, the better off Palestine will be.

Assessing the Human and Social Capital Dimensions of ICT in Palestine:

A Conceptual and Methodological Framework

Mark Warschauer

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Introduction

It is widely recognized that the ability to access, use, and adapt information and communication technology (ICT) is a critical factor in human and social development in today's world (see, for example, Castells, 1998/2000). Yet assessing the role of ICT in particular societies, and how that role can be enhanced for better promotion of development, is no easy task. And nowhere is this more difficult than in the West Bank and Gaza, where the Palestinian people face a host of military, political, social, and economic challenges that severely complicate both the developmental process as well as attempts to study that process through social science research. Nevertheless, due precisely to the many challenges that the Palestinian people face—as well as the critical role of Palestine in Middle Eastern and world affairs–it is especially important to better understand and address their developmental needs, and the potential role of ICT to help advance them.

This paper puts forth a conceptual framework for assessing the contribution of ICT access and use to human and social capital formation in Palestine. It begins with a general discussion of the relationship of ICT to social development. It then examines the social, economic, and political context of the Middle East and Palestine, and next the introduction of ICT into this context. Finally, it considers methodological issues for studying the human and social capital components of ICT access and use, with a focus on the West Bank and Gaza.

ICT and Development

There is a high degree of correlation internationally, whether measured among people or nations, of income and access to ICT. Figure 1, for example, compares the shares of global gross domestic product (GDP), exports, and Internet users among the 20 percent of the world's people who live in the richest countries, the 20 percent of the world's people who live in the poorest countries, and those in between. The richest 20 percent dominate in all three areas.

Similarly, Internet content production is overwhelmingly concentrated in the more developed countries. As seen by the map in Figure 2, Internet production is highly concentrated in cities of the US and North America, with some pockets of production in East Asia.

Of course correlation does not necessarily imply causation. Just because the high-income countries feature the greatest amount of Internet access and use, it does not imply that Internet diffusion has caused them to be rich. A more likely explanation is that the causation runs in the other direction, with high-income societies and individuals better able to afford new technologies.

Figure 1
Shares of Global GDP, exports, and Internet users among world's population, 1997.
Source: United Nations Development Programme (1999)

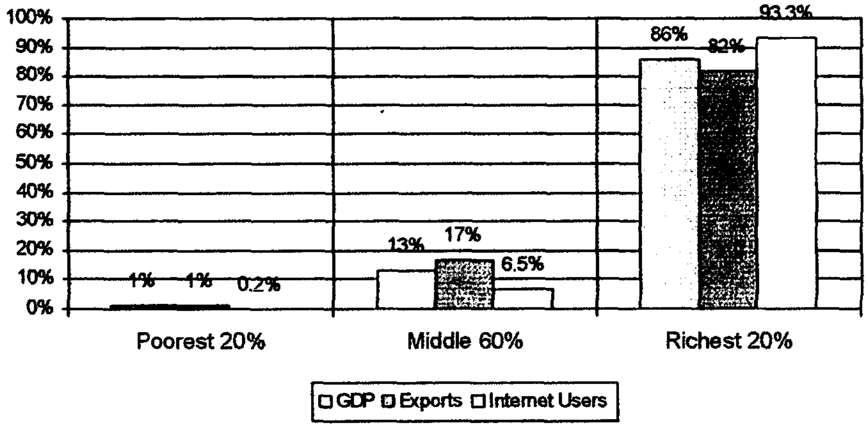
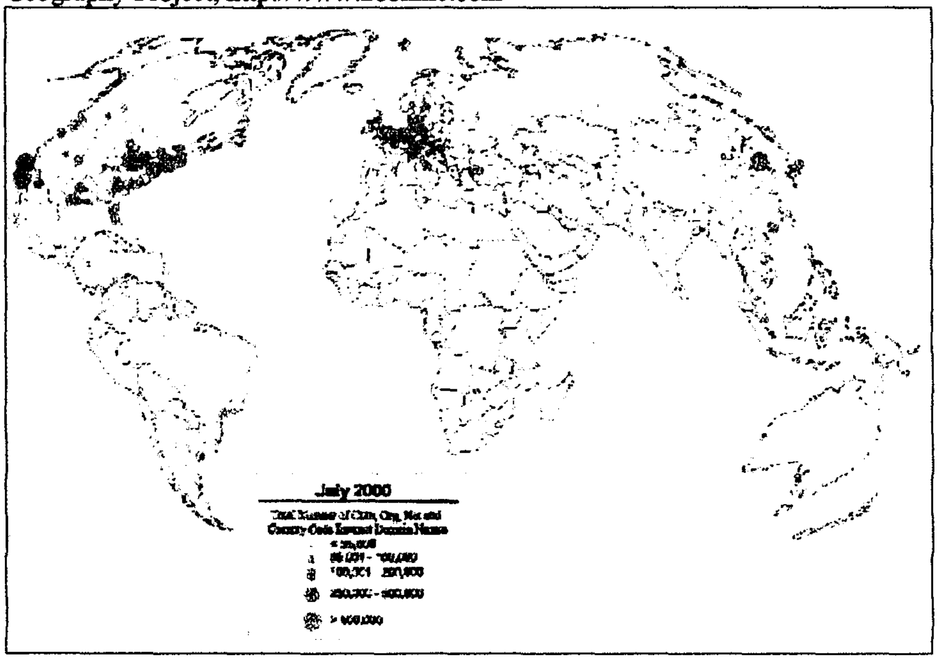


Figure 2
Total number of top-level domains (.com, .net, .org, country codes), by city, July 2000
Source: Map based on methodology described in Zook (2001). See also Zook's Internet Geography Project, http://www.zooknic.com



Having said that, it is important to recognize that ICT can and does play an important role in human and social development if technological interventions are carried out with developmental goals and contexts fully in mind. Increased access to and use of ICT can, in the right circumstances, support better health care diagnosis and delivery, make available educational resources, assist with monitoring and protection of the environment, provide help for small businesses, facilitate government transparency and accountability, connect diasporic resources and their homeland communities, and empower civil society organizations with improved communication and publishing capacity (Gurstein, 2000; Loader, Hague, Keeble, & Eagle, 2001; United Nations Development Programme, 2001; Warschauer, 2003c).

Such positive results are more likely to be achieved if ICT is seen not as an end in itself but a component of a broader developmental process. One useful framework in this regards is known as *community informatics* (Gurstein, 2000; Loader et al., 2001). Community informatics seeks to apply ICT to help achieve the social, economic, political, or cultural goals of communities. Community informatics begins from the perspective that ICT can provide a set of resources and tools that individuals and communities can use, initially to provide access to information management and processing, and eventually to help individuals and communities pursue goals in local economic development, cultural affairs, civic activism, and community-based initiatives (Gurstein, 2000). Community informatics strives to take into account the design of the social system and culture within which the technology resides, as well as the design of the broader technological system within which a particular tool or medium interacts.

Other theoretical frameworks complement this perspective. Kling's *sociotechnical model of ICT* emphasizes the social embeddedness of technology. Feenberg's (1991) *critical theory of technology* situates ICT within the unequal power relations in society. *New institutionalist* approaches to social science research (Dimaggio & Powell, 1991; Goodin, 1996) stress how social structures shape, and are shaped by human interaction and technological innovation, thus pointing to the co-constituitive relationship of technology and society.

All of these approaches underscore the importance of accounting for broad social context when evaluating ICT's role. I therefore turn to the second main section of this paper, a discussion of the social, economic, and political context of ICT diffusion and usage in the Middle East and Palestine.

Development Challenges in The Middle East and Palestine

The United Nations Development Programme (2002) defines development of as "a process of enlarging choices" (p. 15). By that definition, the Middle East as a region faces daunting developmental challenges. Not a single one of the Arab countries of the Middle East and North Africa enjoys a high level of democracy, and those countries as a whole "evince the lowest levels of freedom among the world regions" according to a report of prominent group of Arab scholars (United Nations Development Programme, 2003). Particular problems cited include a low level of civil and political liberties, extremely limited government openness and accountability to public opinion, heavy government censorship of the media and elevated levels of perceived corruption.

These political problems are accompanied by a wide range of social ills in the Arab world, including restricted opportunities for women; high levels of illiteracy (again, especially for women); and dysfunctional educational systems, which emphasize rote learning to the exclusion of independent thinking skills (United Nations Development Programme, 2002, 2003).[1] A telling example of how troubled the education systems are in the Middle East is found in the region's largest country, Egypt, where research indicates that schooling actually subtracts a person's economic value: high school graduates in Egypt who don't continue on to university have less earning potential than people who have only partially completed primary school (Bartsch, 1995; Fergany, 1998). The Arab countries also rank at or near the bottom, compared to other regions of the world, on a wide range of other cultural and scientific indices, including number of international patents registered, number of students enrolled in scientific disciplines, quantity and quality of scientific research, number of original works published, and number of foreign language works published in translation (United Nations Development Programme, 2003).

Finally, economically, though there is a wide range of economic development among the Arab countries, nearly all suffer in low productivity and slow growth rates. Even the nine richest Arab countries have only one-half the gross national product per worker of Argentina (United Nations Development Programme, 2003), while the oil-poor Arab countries have less than one-tenth Argentina's economic productivity. Low productivity and poor growth rates have caused the Arab countries to fall far behind the economic development of many countries of Asia and Latin America that were at a similar economic level 25 years ago.

The social, political, and economic problems facing the people of the West Bank and Gaza are even more acute then those of the Arab world in general. Since September 2000, more than 2400 Palestinians have been killed and 41,000 injured in the Israeli-

[1] The harsh findings of the two UNDP Arab Human Development reports have caused some consternation in the Arab world, with many fearing that the data reported will be taken out of context and used to support inappropriate neoliberal (or neoconservative) interventions. While these fears may be justified, the reports do represent the most thorough and detailed analysis of the social, political, and economic state of the Arab world, and thus make a needed contribution when understood in the proper historical context.

Palestinian conflict, and thousands more have been rendered homeless (United Nations Development Programme, 2003). Closures, curfews, checkpoints and roadblocks divide the territories into more than "300 separate clusters," while Palestinian human development has suffered from "loss of freedom, livelihoods, destruction of basic infrastructure, and an alarming decline in health conditions"(United Nations Development Programme, 2003, p. 24). Normal economic, educational, and social activities have been severely curtailed, resulting in a 50 percent reduction in Palestinian GDP over the last four years, a tripling of the poverty rate, and a drastic increase in unemployment (United Nations Development Programme, 2003). The separation barrier currently being constructed by Israel across the length of the West Bank—alternately referred to as a security fence by Israel and an apartheid wall by the Palestinians (Parry, 2003, 2004)—threatens to further restrict the internal movements, and economic opportunities, of the Palestinian people.

Meanwhile the West Bank and Gaza Palestinians, albeit in circumstances shaped by a history of military occupation, suffer from similar types of authoritarianism at the hands of their leaders as do people in other Arab countries, with heavy degrees of censorship and corruption and little accountability from the Palestinian Authority, resulting in increasing amounts of internal conflict (Saouli, 2004).

Finally, while both the broader Arab world, and Palestine in particular, have proven resistant to social, economic, and political reform, it should also be stressed that the region is highly unpredictable and dramatic changes are not out of the question. The aggressive role of radical Islamist groups in the international arena, the volatile situation in Iraq following the US military intervention and occupation, and changes in the Israeli-Palestinian dynamic—for example, resulting from the Israeli withdrawal from Gaza and the victory of Hamas in the January 2006 Palestinian elections—all could result in transformations in the region.

These then are the general political, economic, and social factors that shape ICT policy, access, and use in the Middle East and Palestine. How specifically have various actors tried to introduce or gain access to new technologies within this context?

The Role of ICT in the Middle East and Palestine

The Arab countries of the Middle East and North Africa are woefully underserved by ICT. As of 2001, some 2.4 percent of people in the Arab countries had access the Internet, representing about half the access rate of Latin America or Asia and one-tenth the access rate of Europe (see Table 2).

Table 2
Internet access rates, August 2001
Source: adopted from NUA (2003) and Population Reference Bureau (2001)

Region	Number of People with Internet Access (millions)	Percent of Population with Internet Access
US and Canada	181	57.2
Europe	155	21.3
Latin America	25	4.8
Asia	144	3.9
Middle East	5	2.4
Africa	4	0.5
World	513	8.4

The Arab world is even further behind when it comes to the publication of native-language content on the Internet. According to an analysis by Carvin (2001) of Pastore's (2000) data set, there existed only one Web page in Arabic for every 1583 speakers of the language in the year 2000—a ratio dramatically worse than that of the other 30 languages represented in the data (see table 3). While this ratio has probably improved in the last few years, there is little doubt that there is still a dearth of Arabic language Internet content in comparison to that available in many other languages.

Interestingly the Arab countries are further behind other regions of the world in Internet access then they are in computer ownership (United Nations Development Programme, 2002). Thus the causes of limited Internet access and use appear to go beyond the general expense of purchasing a computer. Additional reasons for low levels of Internet access and use, even when compared to other developing regions, include the predominance of monopolized telecommunication sectors, resulting in poor service and expensive rates; unfriendly business climates, discouraging telecommunication investments; heavy-handed government control of the media, resulting in Internet censorship; low levels of literacy when compared to other regions of similar economic development; underdeveloped business and academic sectors, depressing demand for global communications; a cultural climate that is sometimes hostile to outside ideas and influence; insufficient Arabic language software and standards, complicating online interaction and publishing in Arabic; and limited knowledge of English or other European languages (see discussion in Burkhart & Older, 2003; Dutta & Coury, 2003; Nour, 1983; United Nations Development Programme, 2002, 2003; Warschauer, 2003c)

Table 3
Ratio of speakers of a language to Web pages in that language
Source: Carvin (2001)

Rank	Language	No. of Web pages	No. of Speakers	Speakers/Web page
1	English	214,250,996	322,000,000	1.5
2	Icelandic	136, 788	250,000	1.8
3	Sweden	2,929,241	9,000,000	3.1
4	Danish	1,374,886	5,292,000	3.9
5	Norwegian	1,259, 189	5,000,000	3.9
6	Finnish	1,198,956	6,000,000	5.0
7	German	18,069,744	98,000,000	5.4
8	Dutch	3,161,844	20,000,000	6.3
9	Estonian	173,265	1,100,000	6.4
10	Japanese	18,335,739	125,000,000	6.8
11	Italian	4,883,497	37,000,000	7.6
12	French	9,262,663	72,000,000	7.8
13	Catalan	443, 301	4,353,000	9.8
14	Czech	991,075	12,000,000	12.1
15	Basque	36,321	588,000	16.2
16	Slovenian	134,454	2,218,000	16.5
17	Korean	4,046,530	75,000,000	18.5
18	Latvian	60,959	1,550,000	25.4
19	Russian	5,900,956	170,000,000	28.8
20	Hungarian	498,625	14,500,000	29.1
21	Portuguese	4,291,237	170,000,000	39.6
22	Greek	287,980	12,000,000	41.7
23	Spanish	7,573,064	332,000,000	43.8
24	Lithuanian	82,829	4,000,000	48.3
25	Polish	848,672	44,000,000	51.8
26	Hebrew	198,030	12,000,000	60.6
27	Chinese	12,113,803	885,000,000	73.1
28	Turkish	430,996	59,000,000	136.9
29	Bulgarian	51,336	9,000,000	175.3
30	Romanian	141,587	26,000,000	183.6
31	Arabic	127,565,000	202,000,000	1583.5

In spite of—or, to some extent, because of—this situation, most Arab governments are committed to rapid expansion of the Internet, and ICT in general, so as to better compete in the global economy. Burkhart and Older (2003) divide the countries of the Middle East and North Africa into three groups vis-à-vis their Internet policies: those that are *driven* toward faster development and thus adopt liberal Internet policies (Bahrain, Egypt, Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, and Yemen); those that are *fearful*, and thus clamp down on the Internet (Algeria, Libya, Syria, and pre-occupation Iraq); and those that seek the *best of both* by allowing some Internet use under tight political control (including Iran, Saudi Arabia, Tunisia, and United Arab Emirates). This analysis makes sense with two caveats. First the direction is generally toward more open access, with all the countries in the *fearful* gradually (or suddenly, in the case of Iraq) moving toward the direction of either *fearful* or *best of both*. Second, in the Middle East, the notion of liberal policy is itself relative, even in the *driven* countries. In Egypt, for example, a country that has taken a number of steps to facilitate Internet access, there exists an Internet Crimes Unit within the Interior Ministry that is known to arrest gay men after entrapping them through fake dates online (Bahgat, 2001).

As elsewhere in the world, ICT access in the Middle East is shaped and constrained by broader issues of social, economic, and political power. This applies not only to differential access between the Arab world and the developed countries, but also to issues of inequality within particular Arab countries. The policies of the *driven* countries, which invest substantial resources in promotion of ICT, often serve to heighten social and economic inequality rather than help overcome it.

For example, in an earlier paper (Warschauer, 2003a), I discuss how Egypt's substantial investments in educational technology have served to give the illusion of modernity without having any substantive affect on teaching and learning, while at the same time diverting money from more pressing educational concerns, such as improving literacy and school access to girls in rural areas, and concentrating additional resources among the already more privileged sectors. Waked (2004) describes this process as the "ICT Game" (p. 1). According to the rules of this game, ICT discourses, policies, and investments all emphasize the role of technology and its importance, but actual access to and use of ICT is constrained either by conscious strategy or by underlying structural impediments such as illiteracy and poverty. The main effect of the game is to channel economic resources to the wealthy elite who dominate technology industries while strengthening the surveillance power of the state.

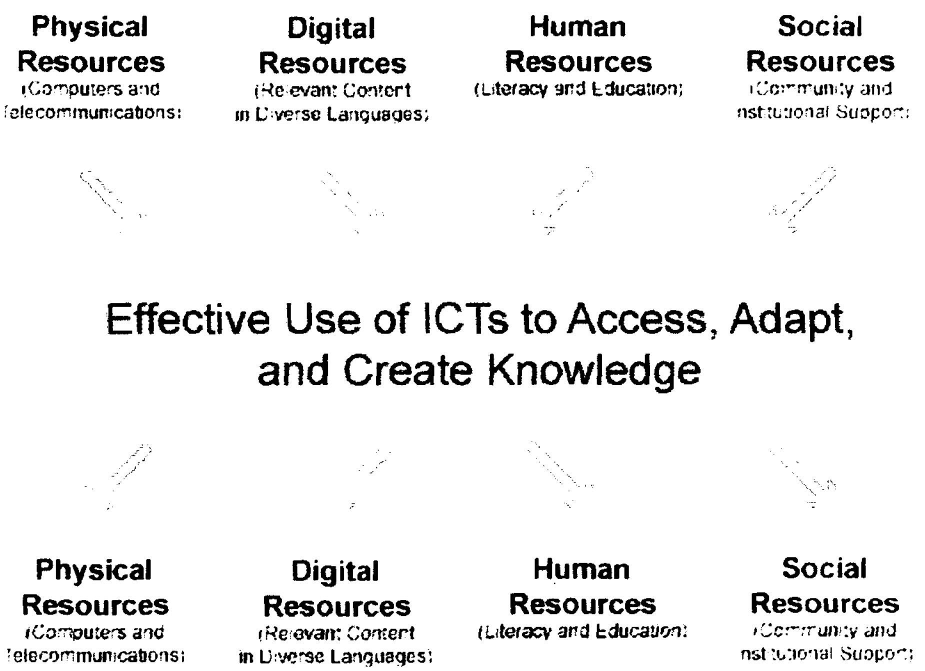
In the West Bank and Gaza, access to and use of ICT can only be understood in relationship to the Israeli occupation. From the days the Internet was first established in the Palestinian territories, it has been dependent on Israeli infrastructure (Cisneros, 2001; Ein-Dor, Goodman, & Wolcott, 2000). The occupation and consequent economic hardship and political instability have made diffusion of ICT more difficult by depressing consumer demand for technology and discouraging industry investment. Israeli incursions in populated areas, together with the large number of road blocks and other obstacles to mobility, make the maintenance of any kind of infrastructure difficult; how specifically this affects ICT access and use, and what can be done about it, should be an important component of study. At the same time, the occupation has motivated the Palestinian people to go online both to overcome problems of physical separation–Palestine from the diaspora, occupied territories from Jerusalem and Israel, Gaza from the West Bank, and across blockades and road closures throughout the territories—as well as to make their voices heard in the international arena (Federman, 2003). According to Sabri Saidam, head of the Palestine chapter of the Internet Society, Internet usage in the West Bank and Gaza rose from 2 percent of the population in 1999 to 8 percent in 2003, as students turned to cyberspace tutoring when classrooms were closed, relatives and friends stayed in touch through chatrooms, and activists circulated pictures and accounts of alleged atrocities (El-Haddad, 2003). Finally, though little has been reported on the matter, Palestinians probably face less chances of Internet censorship than do their counterparts in neighboring Arab regimes, with the Palestinian Authority too weak to control online communication and the Israeli security forces more interesting in monitoring their communication than censoring it.

Methodological Considerations

With this as a backdrop, what potential does ICT have for facilitating human development in Palestine, and how can the role of ICT in human and social capital promotion there be assessed?

Based on a three-year study in Egypt (Warschauer, 2002a, 2003a, 2003b, 2004), I identified four sets of resources that are important components of meaningful ICT access for human and social development: (1) Physical Resources, (2) Digital Resources, (3) Human Resources, and (4) Social Resources (see Figure 3, Warschauer, 2002c; Warschauer, 2003c). Digital resources refer to content that is made available online, and takes into consideration the matter language as well. Human resources revolve around issues such as literacy and education (including the particular types of literacy practices that are required for computer use and online communication). Social resources refer to the community, institutional, and societal structures that support access to ICT.

Figure 3
Resources Contributing to ICT Access



These resources have an iterative relation with ICT use. On the one hand, each of the resources is a *contributor* to effective use of ICTs. In other words, the presence of these resources helps ensure that ICT can be well used and exploited for developmental purposes. On the other hand, access to each of these resources is also enhanced as a *result* of effective use of ICTs. Measuring these resources thus serves the dual goal of assessing the current status of ICT access and use, as well as evaluating the potential for further development.

How then might these resources be measured in a Palestinian context?

Physical Resources

Physical resources, encompassing computers and telecommunications and the ability to physically access them, can be measured in a number of ways, including, most commonly, the percentage of people who own a computer or have Internet access at home (see, for example, United Nations Development Programme, 2003; World Bank, 2001). However, physical access to ICT in the Palestinian context is likely to take a wide range of other means, beyond home computer and Internet use, that need to be also queried. Important points to consider include how frequently computers, the Internet, or other digital technologies are accessed and used, what purposes they are used for, and the locations of their use (home, work, friends' home, school or university, public access center, etc.) As Hargittai (2003) points out, great variations exist in *autonomy of use*, with people feeling more or less constrained depending on how readily available access is, whether they have to travel to use it, and whether the environment is conducive to unrestrained communication.

The technical means are also highly relevant (is the Internet being accessed via a dial-up modem or a direct connection), as outdated equipment or sub par connectivity can discourage regular and effective usage (Dimaggio, Hargittai, Celeste, & Shafer, 2004). Finally, analysis at multiple points of time—how long people have had access to computers, and whether they expect their access to change in the future—can also provide insights into trends in usage.

Digital Resources

By the term digital resources I refer to the types of online or computerized content that people have available to them. As discussed earlier, Internet content production has traditionally largely dominated by the developed nations, yet, at the same time, new online tools such as software for Web logs (i.e., blogs) makes online publishing potentially more accessible to wider groups. An assessment of online content both accessed and created by Palestinians can help point the way to further needs in this area.

For example, the UNDP Programme of Assistance to the Palestinian People (2003) has posited four target areas in which ICT could make the most important contribution to human development in the West Bank and Gaza: health, education, private sector, and governance. It would be critical to consider what kinds of digital information, content, information, materials, and resources that Palestinians currently access or create in relationship to these four areas, and those resources are deemed suitable and sufficient. Since an important principal of ICT for development involves enabling actors to define their own needs, people should also be encouraged to point out additional areas of content that would benefit their communities and nation.

The issue of digital resources also calls into question the language that materials are available in. As pointed out earlier, online materials in Arabic are drastically underrepresented on the Internet. In the long run, the development of better Arabic language software and standards will be vital toward addressing the needs of the Palestinian people. For the current project, it is important to inventory both what languages Palestinians use in accessing and creating diverse types of Internet content, and the extent to which language represents an obstacle in online information gathering, communication, and publishing.

Human Resources

By human resources, I refer to literacy, education, and other forms of human capital. ICT is widely used to promote human capital, for example, through the use of computers and Internet schools. At the same time, a certain amount of human capital, including reading and writing ability, language ability (see above), and skill with computers is required to effectively use ICTs.

I have previously analyzed four types of digital literacy required for effective use of ICT (Warschauer, 2003c). *Computer literacy refers* to the skills and fluency in using a computer, and includes keyboarding and knowledge of computer functions. *Information literacy* involves ability to use ICT to locate, evaluate, and use information, including being able to

- Develop good quality research questions
- Determine the most likely places to seek relevant information
- Select the most appropriate search tool
- Formulate appropriate search queries
- Rapidly evaluate the result of a search query, including the reliability, authorship, and currency of a source
- Save and archive located information
- Cite or refer to located information (see further discussion of these points in Shetzer & Warschauer, 2000)

Multimedia literacy involves the ability to critically interpret information presented in multimedia mode, as well as to create and publish material incorporating multiple media. Finally, *computer-mediated communication literacy* refers to the interpretive and writing skills necessary to communicate successfully with other people in online modes, including the pragmatics of effective interaction in various sorts of Internet media (e.g., e-mail, Web-based bulletin boards) and, at an advanced level, the ability to establish and manage online communication for the benefits of group (e.g., community organizations running their own discussion or training sessions online.

Differential access to these four types of literacy has a huge impact on people's ability to make use of ICT to achieve their goals. Hargittai (2002a; 2002b), for example, conducted an extensive observational and interview study of a randomly selected Internet user population from the general public in the U.S., and found that some people had little awareness of the Back button, (a button ordinarily used in 30 percent of people's browsing activities, see Tauscher & Greenberg, 1997), while others had little sense of how to put search terms together, and some rarely used search engines at all. Because of these differences, some people were able to complete all basic Internet search tasks that she designed, while others could complete only one or two.

In the Palestinian context, where people have much more limited access to computers and the Internet in the U.S., and there is much less knowledge of English (the main language found on the Internet, see Warschauer, 2002b), it is expected that insufficient digital literacy can be an important obstacle toward Palestinians' making effective use of ICTs. It will thus be critical to assess the knowledge, skills, and attitudes that Palestinians have in relationship to these diverse types of digital literacy.

Finally, one of the main venues where Palestinians will engage with new technologies for human capital development will be in schools and other educational institutions. Therefore, an in-depth assessment of the physical inventory of new technologies in schools; the types of technology that students and teachers are able to access inside and outside of school; the ways that new technologies are integrated into curricula; and the knowledge, skills, and attitudes toward ICT that students and teachers have will all be important components of a national study of ICT and Palestinian development (for information on a national educational survey of ICT use in the US, see Becker, 2000a, 2000b; 2004).

Social Resources

As important as any of the other categories are *social resources*. These involve the types of community and social support that both enable and result from access and use of ICTs. These social resources can be analyzed at three levels of social capital: the micro, macro, and meso (see Warschauer, 2003c).

The micro-level refers to the kind of support for computer use that people get from personal interaction with those in their immediate community. A number of studies have found that social contact with other computer users is a key factor in whether and how people are able to access ICT themselves (see, for example, Regional Technology Alliance, 2001; Stanley, 2003). Social capital at this level can also become a lever to help people benefit from digital information even if they themselves are not computer users, for example, if other members of their neighborhood, community, or organization find information and pass it on to them. This type of information access may be especially important in the Palestinian context. The micro-level also includes people's ability to make use of ICT to overcome obstacles at communication with their network of social contacts. Again, this is particularly important in the West Bank and Gaza, due to the types of isolation imposed by the occupation, isolation which has itself motivated greater Internet use (see Federman, 2003). In this regard, it may be especially helpful to investigate how early adopters have been able to successfully overcome the challenges they face to gaining ICT access in the Palestinian context.

If micro-level corresponds to bottom up matters, the macro-level refers to top-down uses of technology, in particular through e-governance. Positive examples exist for national, regional, and local governments making use of online resources for promoting better transparency and citizen voice (see The E-Governance Institute, 2004; Warschauer, 2003c). The limitations placed on the Palestinian Authority by Israel obviously limit the PA's ability to implement full e-governance, or, indeed, governance of any time. At the same time, the PA and its affiliated bodies do indeed make use of the Web (PNA, 2004), and achieving greater transparency and voice within the PA has been a demand put forward both by external donors as well as by Palestinian activists (Shikaki, 2004; The World Bank Group, 2002). Therefore, surveying official Palestinian online resources and how they are currently being used, as well as ideas for better use, will be an important matter.

Finally, economists and social theorists point to a midlevel form of social capital between the micro-level of an individual's personal networks and the macro-level of governmental institutions. This meso-level may involve, on the one hand, corporate or business units, and, on the other hand, voluntary associations and civil society (see discussion in Turner, 2000; Warschauer, 2003c; Woolcock, 1998).

The UNDP Programme of Assistance to the Palestinian People (2003) has pointed to three main potential roles for ICT in the private economic sector: as an output and production technology (e.g., through development of software of Web content),; as an information processing technology (e.g., to handle information that arises from both inside and outside the enterprise); and as an information communication technology (e.g., to receive and provide information to others). Within these three general categories, the UNDP/PAPP identified two specific priority areas, involving the use of ICT as (1) a marketing and promotional tool for both local and international markets; and (2) as a tool for improving management and financial systems. Any study that seeks to better understand the role of ICT in Palestinian development should investigate the capacity of Palestinian businesses and their personnel to make use of new technologies, keeping these potential roles and priority areas in mind.

Further development of voluntary associations and civil society can only be a positive factor in Palestinian development. Currently, Palestinian civil society suffers from the hardships of Israeli occupation as well, in some instances, as restrictions placed on grassroots activism by the Palestinian authority. The use of ICT can assist civil society groups in a number of ways, particularly through providing a low-cost means of publishing material and of communicating among a group when face-to-face gatherings are not feasible (Klein, 1999), as is frequently the case in the West Bank and Gaza. Identification of the various forms of voluntary association that Palestinians engage in, and how they currently, and potentially, make use of ICT, will be an important component of a national ICT survey—bearing in mind, of course, that gathering information about people's forms of association is often a sensitive matter.

Of course there are other forms of micro-, macro-, and meso social capital that do not refer directly technology but still have important influence over how technology might be used in a society. The levels of social trust that exist within a community, the expectations and norms that a society has regarding people's behavior, and the existing strong and weak ties that people have in their community, nation, and around the world will all influence the ways that people can and do make use of technology. Research methods, such as surveys, can attempt to assess these factors through examining issues such as who people communicate with, how often, and why; what sources of information they find trustworthy; and what expectations they have for themselves, their neighbors, and their children regarding issues such as education, information, and media, and technology.

Finally, it is important to point out that these four sets of resources are highly interactive with each other and with other societal dynamics. Consider, for example, the potential contribution of ICT to Palestine's economic development. Many in Palestine, as elsewhere in the developing world, would like to emulate India's success in stimulating economic growth (regionally, if not nationally) through a successful information technology industry. However, India's success in this area depends on a number of factors, including a high degree of English language ability among the educated population; a freedom of travel for many of its university students, researchers, and business leaders to the United States and back; and the existence of domestic universities with strength in engineering. In Palestine's case, such conditions do not exist, and, barring other long-term major transformations in the nation and region, it is unlikely to anticipate the emergence of a major IT industry in Palestine. However, the diffusion of ICT can have numerous other social and economic benefits as discussed above, including contributing to the developmental well-being of the Palestinian people (e.g., through improved access to health and education resources), improving the management of Palestinian companies and marketing of their products, allowing Palestinians to better express their voice and concerns in the international arena, and creating greater pressure for government accountability.

These benefits will most likely occur if ICT is diffused in a way that best meets the needs of the Palestinian—at least to the extent that that is possible, given current conditions in Palestine. Research approaches are thus needed that accurately assess Palestinians skills, knowledge, attitudes, support structures, and needs vis-à-vis technology, as well as Palestinians own visions of how technologies can contribute to their future.

Research Methodologies

This paper is being written in support of a research project that will be based on a national survey of Palestinians in the West Bank and Gaza. Well-known surveys in the US include several national studies carried out by the National Telecommunications and Information Administration (e.g., 1999, 2000, 2002) and a national educational survey carried out by Becker (2000a, 2000b, 2004).

It is important to also point out additional research methodologies that might be helpful in gathering the kind of data discussed above. One method, known as Participatory Rural Appraisal (PRA), or, in later iterations, Rapid Rural Appraisal (RRA), has proven to be especially effective in gathering community opinion about its own developmental needs in a relatively short time (Chambers, 1992; Mukherjee, 1993). PRA uses focus groups, interviews, door-to-door surveys, community meetings and special participatory exercises (such as mapping activities) to maximize a community's involvement in defining its own needs. Rural ICT projects in other countries, such as India, have made use of intensive PRA campaigns in local communities to apprise local needs and determine priorities (Warschauer, 2003c).

Though PRA and RRA have their roots in rural development projects, they can also be used in urban neighborhoods, and they imply no prior knowledge of computers or the Internet. For example, people in a neighborhood can participate in planning local community technology centers by identifying key neighborhood leaders to help run the centers, or conducting mapping exercises that help identify where a center should be located. They can also identify and map community resources that can be entered into local databases, or identify the kinds of information and resources they would like to have available via an online portal (see discussion in Warschauer, 2003c).

Another approach that has been helpful in illuminating the role of technology among a national culture and people has been ethnography, as evidenced by Miller and Slater's (2000) in-depth examination of the Internet in Trinidad. Ethnographers' long-term insider observations in a community allow them to present a more nuanced look at how people make use of new technologies, how they solve their problems and obstacles related to technology, and how they carry out more general tasks (such as communicating with each other and seeking information) that might be aided by technology.

A fourth helpful methodology is case study research, which focuses on analyzing in depth particular institutions or individuals making use of new technologies (see, for example, Penuel, Michalchik, Kim, & Shear's 2001 case studies of community technology centers in the US, or Fang and Warschauer's 2004 case study of technology and curricular reform in China).

Finally, direct observational research, such as that performed by Hargittai (2002a; 2002b), can supplement what people say about how they make use of ICT to directly observe their practices and skills in ICT usage.

Whether or not any of these methodologies are deemed feasible within the current study, they should be considered as possible approaches for future research on ICT in Palestine. The diffusion of ICT involves complex power relations among donor nations, non-governmental organizations, local elites, occupying powers, and various groups of citizens (see discussion in Waked, 2004, Warschauer, 2003c), with the benefits of IT distribution often accruing elsewhere than to those who need it most (see discussion in Luyt, 2004). Surveys alone are unlikely to fully reveal the intricate dynamics of power that influence who accesses ICT and who benefits from its use. A multi-method approach, investigating a number of institutions and groups—ranging from schools and universities to businesses to refugee camps to development projects—will thus be advantageous. This investigation should be directed both at early adopters as well to those sections of the population without any direct access to ICT. It should also attempt to analyze computer and Internet access and use within a framework of analysis of other new and old media, including audiotapes, newspapers, mobile phones, and satellite television.

Conclusion

ICT does not provide a magic bullet for human or social development. Rather, access to and use of ICT is embedded in complex social contexts, in which it tends to magnify efforts already underway. ICT will certainly not solve the numerous political, economic, and social challenges facing the Palestinian people. However, to the extent that the Palestinians themselves are engaged in fruitful efforts to meet these challenges, they will find ICT to be a valuable tool.

However, even to use ICT as a developmental tool involves important challenges. Many donor-funded ICT projects have failed due to haphazardly foisting technologies on recipients, without first taking into account local contexts (see, for example, Warschauer, 2004). Any attempt to deploy new technologies to promote human and social capital development in Palestine will thus need to take account of the very particular context of the Palestinian people in the West Bank and Gaza, and the specific developmental challenges they face, including both the occupation of the territories by the Israeli government as well as a general political, social, and economic climate in the Arab world that is not conducive to reform. This can be carried out within a holistic framework that interrogates and analyzes access to and use of ICT within the context of four sets of resources—physical, digital, human, and social—and in relationship to the Palestinian's own developmental needs and priorities.

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Assessment of ICT Indicators with Special Reference to Palestine

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Table of Contents

Introduction

The number of indicators and quantitative assessment tools devised to assess ICT diffusion began to take off at some point during the late 1990s. Their number now reached quite a high level, making it a challenge to select some of these indicators for a given research or policy formulation problem. The emergence of this large number of quantitative tools in the late 1990s is an obvious result of the rapid international diffusion of ICTs that we have been witnessing in the last decade, often described as an "information revolution." In response to the rapid diffusion, statistical concepts were also rapidly developed to analyze and understand how this diffusion proceeds, to point out areas that need "improvement," and to guide policies.[1] That is, as the belief that humanity was undergoing a "global information revolution" has come to colonize the media and communication sciences, it is hardly surprising that many assessment tools evolved to capture aspects of this "revolution." Many donor-agencies and international organizations (IOs) thus readily allocate funds to assess various aspects of ICT diffusion in different countries. Naturally, this has effectively increased the demand for statistical ICT assessment tools and financed their invention. With time, ICT indicators began to multiply.

The emergence and rapid growth of critical literature and digital rights movements which focus on the unevenness and inequality of ICT diffusion around the world – both of which became significant by the late 1990s and grew further in the past few years – probably contributed as well to the growth of both the number and diversity of the quantitative ICT assessment methodologies available. With the rise of such critical movements, demand increased for devising new techniques to monitor and assess ICT diffusion in ways that capture its inequity.[2] Many ICT assessment systems began to identify and monitor factors that influence what has since then been known as the "digital divide"—originally pictured as a binary divide between ICT "haves" and "have-nots"—and ways, or even "Best Practices," to bridge this "divide."[3] Soon after, if not concurrently, another body of critical literature began to challenge the very notion of a dichotomized binary "digital divide," and, by extension, to question prevalent indicators even more.[4] The literature now moves from focusing on the haves versus the have-nots to addressing more complex granulations of how different modes of use are distributed in society and the different empowerment schemes that they put in effect.[5]

This paper addresses such questions in relation to ICT diffusion in the Palestinian territories. It concludes that, for the several reasons discussed below, many standard quantitative ICT assessment methodologies and indicators are indeed somewhat deficient

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[1] See, for example, the discussion on Schaaper's introduction on why statistical indicators are developed and their expected function.

[2] The literature commonly describes two types of divides: between countries and within countries. To get an idea about how the "digital divide" is addressed in quantitative studies see Bridges.org (2001), "Spanning the Digital Divide: Understanding and Tackling the Issue," available at www.bridges.org.

[3] For an example of quantitative attempts to capture the "digital divide," see Orbicom (2003), *Monitoring the Digital Divide and Beyond*, Orbicom report: Montreal.

[4] See e.g. Hargittai, Eszter (2003), *The Digital Divide and What to do About It*, at http://www.eszter.com/papers/c04-digitaldivide.html; (2004); *Classifying and Coding Online Actions*, at http://www.eszter.com/a13-coding.html.

[5] Schaaper, for example, defines the divide as "the gap between those who can effectively use new information and communication tools, and those who cannot." This takes into consideration many complex aspects of the divide that the dichotomy based on use (haves versus have-nots) would most certainly ignore.

with regard to capturing ICT diffusion in Palestine. In response to this, the paper tries to propose ways by which the more suitable of the assessment tools available can be used to assess certain aspects of diffusion in Palestine. The paper finds the statistical concepts that are used in the surveys conducted by the Palestinian Central Bureau for Statistics (PCBS) to represent better alternatives to their international counterpart for evaluating ICT diffusion in Palestine; they are more suited for enabling better-informed policies. Although there is room for improvement in PCBS's indicators, which borrow some of the indicators promoted by IOs such as the ITU and OECD, PCBS represents a better start in searching for indicators to assess ICT diffusion in Palestine.

Although the analysis below addresses ICT diffusion in general, it focuses more on internet diffusion than on other ICTs. It also examines how the Palestinian case provides conceptual insights that are relevant beyond the Palestinian situation. The paper is divided into three parts. Part I situates the analytical problem explored here, selects the assessment systems that will be analyzed, and examines their general limitations. It also provides brief background information about ICT diffusion in Palestine. Part II addresses specific aspects related to measuring ICT diffusion in relation to access, access modes, infrastructure, policy indicators, and so on. Finally, Part III offers some concluding remarks.

— Part I —

Situating the Analytical Problem

Researchers of ICT diffusion have devoted much energy and funding to conducting country assessments and much less to critically examining how assessments are conducted. This is a striking shortcoming. It could be at least partially explained by lack of self-reflexivity in ICT diffusion studies, which would result in many assumptions being accepted without contestation.

Selecting the assessment systems to be analyzed

Given the differences which exist among currently available quantitative ICT assessment methodologies, and because conceptual studies that analyze or compare them are generally lacking, evaluating the (in)applicability of such different methodologies for a case like Palestine has to begin almost from step one. There are, however, far too many quantitative ICT assessment methodologies or systems being used than could possibly be addressed in the space provided. The analysis below will therefore focus only on a select group of assessment systems. Those selected are mainly ones which are: (1) backed by well established IOs that are considered authoritative in the field of ICT policy assessment and formulation; (2) designed to be internationally applicable; and (3) designed to capture the overall statuses of the ICT (or at the very least the internet) sectors. These systems are normally designed to assess diffusion against a number of selected indicators, each of which addresses a specific ICT area. Such indicators are usually integrated so that they collectively produce a picture of the overall ICT landscape in a given country.

The criteria set out above lead as well to the exclusion of a number of quantitative assessment types. This includes assessment methodologies that are designed to address only *parts* of ICT diffusion—those specially designed to address e-commerce, e-governance, or the like—as well as standalone indicators. Both types do not represent cases of overall ICT assessment systems.

Based on the above criteria, the following assessment systems were selected for analysis: Harvard University's "Readiness for the Networked World" indeces; ITU Digital Access Index (DAI); MOSAIC group's e-readiness indexes; Orbicom's *Infostate* Index; World Bank's KAM indexes; The World Economic forum's "Networked Readiness Index" (NRI). Although, strictly speaking, standalone indicators lie outside the scope of this paper, some of the more important standalone indicators will occasionally be mentioned here to complement the analysis and fill some conceptual gaps.[6] Thus, all in all, the systems analyzed here are all well-established assessment systems that are backed by authoritative international institutions and enjoy international fame and authority among "global" ICT professionals and policy officials. They collectively account for most of the widely used approaches for assessing ICT diffusion for policy formulation purposes.[7]

Scope and General Limitations of Quantitative ICT Country Assessment Methodologies

Quantitative country assessment methodologies that are now widely used by IOs and ICT professionals tend to evaluate an "ICT sector" of a given country against a fixed group of statistical concepts; different methodologies resort to differing concepts. In very simple terms, these concepts can be viewed as basic assumptions about ICT diffusion and its socioeconomic effects. Although occasionally they pay lip service to the need for government intervention to safeguard the public good, these assumptions generally abide by neoliberalist free market ideals: policies should enable users, businesses, service providers, regulatory bodies, and hardware providers to dwell comfortably in a global free market.[8] ICT qualities that are typically addressed by these systems are supposedly selected so as to *collectively* reflect and quantify the *overall* status of an "ICT sector" and its main sub-segments in a given country. This often leads designers of assessment systems to devise *overall ICT indexes*, which combine in some way all the indicators that they use in their systems.[9] Since they assume their indicators to be globally applicable, the great majority of these assessment methodologies find it logical to rank countries according to how they score in whichever quantitative indicators are used for measurement. By doing so, they implicitly state that the indicators which they have selected to measure a specific and indeed limited set of "ICT qualities" are both well reflective of the qualities intended to be measured and capable of capturing the whole ICT sector of any given country.

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[6] The ITU list of recommended 50 top indicators includes most of the indicators that are widely used in assessing ICT diffusion. This list is on the ITU website (www.itu.int).

[7] See Bridges.org (2001), *Comparison of E-readiness Assessment Models*, at www.bridges.org, last accessed in November 2004. In this pioneering study, Bridges.org conducted one of the few existing conceptual analyses of the then available ICT quantitative assessment systems.

[8] I have not been able to find any international ICT assessment systems that does not propose these ideals in one way or the other. Policy sections of the quantitative assessment systems available reflect the assumptions described above quite well, more often than not in explicit terms. See, e.g., OECD proposed indicators, World Bank KAM, WEF Network readiness index. This issue is discussed in more detail below.

[9] For example, the ITU digital access index; World Bank KAM index; Orbicom *infostate* index, WEF network readiness index, are supposedly quantitative measures of *overall* ICT e-readiness performance.

On a very basic level, the ICT indicators that these assessment systems use and develop are based on, or derived from, *primary* statistical data obtained from outside—from local and international statistics organizations. Different ICT assessment systems strive to mold and combine such basic data into useful and higher forms of information, each in their own way. Normally, the local statistics bureaus of the different countries compile and publish these primary ICT data. In compiling these statistics, they normally apply some of the following well-known methods:

— Official surveys (e.g., surveying the households with internet access);
— Technology determined data (e.g., determining the number of unique phone numbers that dial up, the average duration of internet sessions, etc. from ISP's log databases);
— Sales registers (e.g., the number of subscribers registered in ISPs' sales records);
— Estimates (e.g., statistics on internet users per capita are often based on estimates. It is often based on multiplying the number of subscribers, or the numbers of unique telephone numbers that dial up, with an estimated factor for the average number of users per dialup. Different statistics bureaus arrive at these estimated factors in different ways – from using household surveys to simply guessing what the average number of users per account *should* normally be [see discussion below]).

Due to the nature of the primary data available, the most important methodological problems that they might pose for country assessments—from a quantitative research perspective—are probably limited to the following:

— The data being unreliable: the data collection process adopts erroneous methodologies or false estimates and thus produces unreliable statistics;
— Different official bodies give conflicting statistics for the same ICT issue;
— Different bodies use different methodologies, resulting in data which supposedly capture similar ICT qualities being incomparable over time or across countries (see discussion on internet access indicators below);
— Some important statistics are missing;
— Some important ICT issues are not monitored by the statistics organizations;
— The statistical concepts used do not reflect the ICT attributes that they claim to be measuring.

Some qualifications are in order here. This paper does not argue that these assessment systems are deficient because they do not compile primary data of their own or because they use data furnished by external organizations. After all, statistical analyses generally analyze data that are regularly compiled by external sources, and this does not belittle their utility or undermine their importance. The point that this paper hopes to draw attention to is that the type of primary data that IOs commonly publish narrows down the scope of these assessment systems. They are designed to work with these data types only. In cases where vital local statistics are available, which would highly enrich the analysis as tends to be the case in Palestine, these systems are incapable of taking such statistics into consideration. They were simply not designed to allow for that. Similarly, important data types that were recommended by IOs but were not used to guide the compilation of actual international statistics—access venue as recommended by OECD, for example—are ignored. As a result, it is not possible to plug crucial data types into these standard assessment systems. Analytical problems that would require making use of data types that are not commonly promoted by centralized IOs, and they are indeed many, cannot be addressed by these ready-made methodologies. The data needed to tackle such problems are simply not reflected in international statistics, even when they can be obtained from other sources.[10]

These quantitative assessment methodologies therefore offer useful tools to apply for analytical problems that do not require extending the research scope beyond the boundaries of the standard types of internationally published primary data. They should be used therefore in light of this shortcoming, with awareness of their applicability to certain types of primary data. In this regard, at the risk of making early oversimplifications, this paper makes four approximate generalizations. First, the scope of applicability of standard quantitative assessment systems is as wide as the number and diversity of the ICT primary data types upon which these systems are built. Secondly, the extent to which the ICT picture that we draw for a given country (by using standard assessment systems) misses out on what we already know about the local realities in this country is proportional to the number and nature of locally available data types which standard assessment systems would refuse to incorporate. Third, and perhaps most important, the severity of the distortions in the ICT picture that we would draw by using these standard systems can be captured in the extent to which local statistics which are ignored by the assessment system provide counterfactual pictures to the ones based on standard assumptions. Finally, because these systems were developed to capture the general international diffusion of ICT in empirical ways, they are less capable of providing relevant local policy information.

Standardizing what is to be assessed

The drive towards standardization can be analyzed on at least two levels: institutional and functional. On the institutional level, this drive can be partly traced back to the elevation of the ITU to becoming *the* IO for collecting and disseminating official ICT statistics— that is, to international centralization. As time passed, ITU country reporting requirements seem to have helped define the process by which different countries compile ICT statistics and the data that they seek. This contributed to forcing an internationally sanctioned order over local representations of ICT diffusion in disparate ICT landscapes. The recent inauguration of the World Summit on the Information Society (WSIS) represents a further move in this centralization/internationalization direction. On the functional level, standardized statistical indicators will facilitate comparative analysis, which would be indeed very difficult to undertake when the official statistical systems of the different countries are based on compiling incomparable or very different primary data types.[11]

Yet, even though the standardization drive has been present for sometime, some margin of difference between countries in compiling and publishing local statistics still exists. International organizations tend to judge this as an aspect that still impedes comparative analysis in some way. As a result, they aspire and push for more

[10] For example, trying to understand what people use the Internet for as a prerequisite to being able to assess their "internet readiness."

[11] For example, comparing between internet diffusion in two countries where one of them publishes diffusion rates in per capita terms whereas the other publishes them in percent of households connected forces researchers to convert one of the numbers to the other. This often entails some guesswork.

standardization. To achieve this goal, 10 authoritative international organizations joined efforts in June 2004 to work on standardizing ICT indicators. The joint project that they inaugurated is called "Partnership on Measuring ICT for Development" and is expected to culminate in a list of international ICT indicators by November 2005.[12]

Universality vs. specificity

Despite their many differences, the ICT assessment systems selected for analysis here share an important and clear structural characteristic. They, and the statistical methodologies from which they emanate, are bounded by an important structural contradiction: claiming "universality" while simultaneously claiming to account for clearly differentiated specificities. This contradiction can be observed on at least two important levels: between different countries, and between different social segments within the same country. Examining this contradiction is important in as much as it delineates the limit that marks where using standard ICT assessment systems can be useful, and where they are simply not applicable. Unfortunately, an understanding of this limit is not always present in assessment reports; very few are aware of it, and even fewer analyze it.[13] This section focuses on the international logic of this contradiction, or limit, while the various forms of its intra-state logic will be dealt with later.

On one side of this contradiction, or let's say the positive side, diffusion indicators seek to facilitate performance assessment against certain "objective" benchmarks. In order to develop these benchmarks and determine average or typical diffusion rates that are applicable for all countries regardless of their specific local conditions, these indicators need to be comparable, and thus "universal." Many ICT reports are aware of this need. For example, Orbicom states that its main task "is of special relevance to the implementation of the Action Plan of the WSIS, which calls for a realistic international performance evaluation and *benchmarking*, through *comparable statistical indicators* and research results."[14] The Networked Readiness Index (NRI) reports, published by The World Economic Forum (WEF), and OECD reports share similar positions. They explicitly emphasize the need to benchmark performance, and also refer to guiding policies by learning from the experiences of others. Striving for universality and benchmarking is therefore a well-established goal backed by some of the most powerful IOs, among which are ITU, World Bank, WSIS, WEF, and OECD.

The act of inventing and standardizing "the international" seems in practice to follow a specific unidirectional logic: developing countries are supposed to translate and adopt the statistical methods of advanced countries. Assessment systems simply do not entertain the opposite direction: that the experience of developing countries could—at

[12] Members of the task force are: the International Telecommunication Union (ITU), which publishes the ITU indicators; Organization for Economic Co-Operation and Development (OECD), which publishes OECD e-measurement indicators; United Nations Conference on Trade and Development (UNCTAD), which is working in one of its projects on "Measuring ICT website"; The Institute for Statistics in the United Nations Educational, Scientific and Cultural Organization (UNESCO); The Working Party on ICT Indicators and MDG Mapping in the UN ICT Task Force; The World Bank; and four regional UN commissions: Economic Commission for Africa (ECA), UN Economic Commission for Latin America and the Caribbean (ECLAC), UN Economic and Social Commission for Asia and the Pacific (ESCAP), and UN Economic and Social Commission for Western Asia (ESCWA).

[13] Bridges.org is among the rare cases where such an aspect occupies the foreground. See Bridges.org (2001);(2005) *Comparison of E-readiness Assessment Models*, available at www.briges.org, last accessed November 2004.

[14] Orbicom (2003), Monitoring the Digital Divide and Beyond, Orbicom report: Montreal. (emphasis added)

least in part—be reflected in "international" ICT assessment methodologies. Or that ICT diffusion in developing countries might have something interesting or unique to share with the world other than being busy catching up.

The report therefore not only identifies the compilation of statistics in developing countries as either lacking, or present but somehow deficient. It also sees this as a situation which "calls for collective action at the international level" —an international problem. Somehow, IOs frame solutions to this "problem" as, "NSOs [national statistics organizations] from advanced countries are invited to [...] provide expertise and advice to NSOs from developing countries, and transfer knowledge in areas such as methodologies and survey programmes."[15] Clearly, the "universality" to which these statistical assessment methodologies refer to is that which is derived from the experience of advanced countries; which is assumed to be culturally and politically neutral and is to be generalized over the whole world. This would enable IOs to "work towards a global database of ICT indicators" that could represent all countries in terms of these "universal" indicators. Moreover, developing countries which fail to measure important ICT attributes, as well as those that measure such attributes in non-global ways, should be assisted in implementing global systems of measurements. This universalization process, in the way described here, is spearheaded by well established IOs, and is explicitly manifested on diverse levels: in the discourse, the funds that guide ICT assessments, and the activities of IOs—conferences held, consultancies provided, task forces created, etc.

The more universal these ICT indicators are, the less they can account for important aspects of ICT specificity in a country where standard assumptions are less valid. In the case of Palestine this shortcoming can be observed on at least two important levels. First, "universal" indicators that would be needed to measure important local aspects of ICT diffusion are simply lacking. How ICT can act as an enabling technology in Palestine is not covered by any of the standard "universal" indicators. To name but a few of them, "universal" indicators to monitor, assess, and identify ways to improve how ICT is used to link the fragmented areas of the territories together; to link students to their universities when under curfew; to facilitate the government's job under occupation and colonization—all are lacking. Such aspects are much more important in the Palestinian context than, for example, e-commerce, which standard assessment systems like so much to measure. But why shouldn't standard indicators ignore these ICT attributes? After all, these are not "universal" needs. The point is not that standard ICT indicators should take these needs into consideration or else become useless. Instead, this discussion urges Palestinian policy makers not to rely solely on "universal" indicators; in doing so, they would perhaps map important general features of ICT diffusion in Palestine but miss out on many areas that are crucial to their society.

The purpose of this discussion is not just to point out that these indicators lack the mentioned balance, or to suggest that they should have a better one, as much as to draw attention to a general limitation of these indicators. Simply put, due to their central desire for "universality," and because they don't adequately account for important local specificities, what these indicators can help us know about ICT diffusion in a given country is limited, especially when applied to ICT diffusion in developing countries. Not surprisingly, important information about ICT diffusion in certain countries must often

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[15] www.itu.int

sought in qualitative analyses outside the realm of these indicators, as testified by ICT country assessment reports themselves.[16] Acknowledging this limit would help researchers and policy makers use these indicators appropriately, not to address problems or deduce generalizations that lie outside their limit, or to ignore important local issues altogether because the indicators direct attention away from them. The following sections will shed light on some manifestations of this principal limitation and will propose some ways to go beyond them.

ICT in Palestine: A Brief Background

The rest of this paper will focus on pointing out concrete areas that need to be taken into account, and will show how standard assessment systems can either go astray or point to factors which are too general to be useful when used independent of other important indicators. Indicators promoted by PCBS will be used here to point out this lack, and to try to work around it. The discussion will thus move to a more local (less international) level. It will focus on concrete country assessment systems and will try to investigate the conceptual implications of applying them for the specific case of Palestine. But, before moving on with this, a brief background introduction about ICT in Palestine is warranted.

Any attempt to explore issues related to Palestine, no matter how narrowly focused or well defined the boundaries of the analytical quest seem to be, is bound to face many conceptual obstacles. The Palestinian case cannot be reduced into simple representations. It is the product of a complicated and long history; is influenced by many regional factors; has enormous regional implications; lies at the center of international conflicts, now claimed by some to be conflicts of "civilizations"; is at the crossroads of superpower interests in the middle east; involves some of the most important humanitarian crises; and is highly misrepresented in the media. It is therefore virtually impossible to develop any comprehensive background for Palestine. This section will therefore only attempt to sketch key background issues that bear direct and special influence on ICT diffusion in Palestine; subsequent sections will gradually bring more aspects related to ICT diffusion in Palestine into the discussion—on a thematic basis. Diffusion of ICTs in Palestine faces many unconventional conditions that prevail perhaps only in Palestine. Yet it is precisely because Palestine represents such a unique and special case that the Palestinian specificity can be especially informative for testing the general suitability of current ICT assessment indicators.

The "Palestinian territories" is a name that denotes the parts of historical Palestine that were not annexed by Israel in the 1948 war. The "territories" is divided into two disjointed parts—the West Bank and the Gaza strip—which collectively cover 22 percent of historical Palestine. After the creation of Israel on the remaining parts of the Palestinian homeland, the West Bank and Gaza were kept under Jordanian and Egyptian control respectively, as shown in Figure 1. They remained under Jordanian and Egyptian administration until 1967 when Israel occupied and colonized them. Since the creation of

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[16] This is well reflected in the fact that some of the most important information about a country under assessment are frequently provided in explanatory narratives which address issues that lie outside the scope of the indicators. For example a country assessment report for Internet diffusion in Ghana provided one of its most important empirical findings—that the Internet is overtaking the market for long distance telephony—in explanatory narrative and not in its core analysis. See, Foster, William et al (2004), "Global Diffusion of the Internet IV: The Internet in Ghana," *Communications of the Association for Information Systems*, (v.13, 2004), pp 654-681.

the Palestinian National Authority (PA) in 1994, some parts of the territories were put under various types of partial Palestinian control, while they remained under overall Israeli military occupation. The following table shows some of recent general indicators related to the territories.

Prior to the creation of the PA in 1994, ICT diffusion in Palestine was generally under Israeli control, which strived to keep it at very low levels (see discussion on sovereignty below). ICTs, however, diffused very rapidly since then, even though they started off from extremely modest levels. Penetration of telephone landlines in households, which represents the core upon which much of the internet diffusion has been based, grew from a mere 3.4 percent (per 100 inhabitants) in 1995 to almost 40 percent in 1999—almost 550 percent growth in a period of four to five years.[17] Since then, teledensity flattened, maintaining a constant diffusion level at 40 percent of households. Other ICTs continued to grow between 1999 and 2004, as shown in Table 1, which illustrates the growth of basic ICTs ranked according to their growth rate. The main points are that the ICT story in Palestine is firstly quite young, and secondly that it has passed through three qualitatively different stages: prior to 1994 ICTs were almost nonexistent compared to other countries; from 1995 to 1999 the infrastructure grew rapidly, opening the door for new opportunities which pioneering users capitalized on; since 1999 infrastructure growth leveled off under the pressure of enormous political and military forces but access and use indicators grew rapidly as more (non pioneering) users began to capitalize on the new opportunities that ICT creates. Third, and perhaps most important, it is quite clear that the political situation and the degree to which Israeli practices deter the diffusion are the most important determinants of ICT diffusion in Palestine. The table below focuses on the growth which occurred in the last stage, while the developments which took place in previous stages are reflected in the growth trends of teledensity.

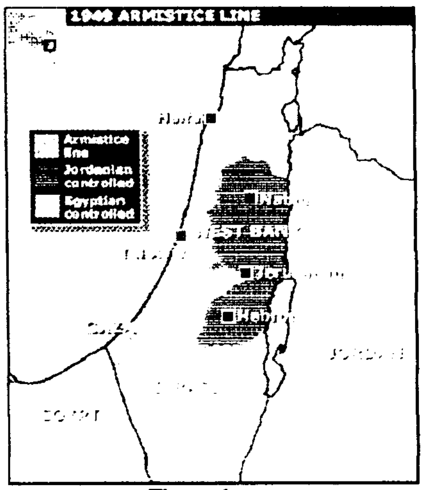

Figure 1

[17] 1995 figures from Palestinian Ministry of Telecommunication and Information Technology (2003), *Palestine Paper for the World Summit on the Information Technology*; Household diffusion rates from PCBS survey 2004; per capita figures from ITU statistics 2003.

Population growth: 3.5% (PCBS, 2004 estimate)
Language: Arabic

Monetary unit: Jordan dinar, Israeli shekel
Main exports: Citrus
Total telephone subscribers per 100 persons: 22% (ITU, 2004); world average is 40%
Internet diffusion: 9.2% of households have internet available at home; 11.2% of population ten years or older use the internet (PCBS, survey 2004).

Population density: 601 (persons per sq. km, ITU 2004); world average is 47; the Gaza strip is one of the most densely populated areas of the world.
GNI per capita: US $1,110 (World Bank, 2003)
Main trade partner: Israel
internet: introduced in 1994; commercialized in 1995 (Madar research group)
Internet domain: .ps

As mentioned, the diffusion of landlines exploded some time after 1995 and then stopped increasing in 1999 when it had reached 40 percent of households. However, although it remained constant since then, it seems that its growth, until 1999, opened an important door for other ICTs to grow until 2004, a door which was previously shut by Israeli forces. This is especially relevant with respect to internet availability in households, which requires a minimum threshold of teledensity to take off.

The relative growth of basic ICTs in Palestine during the past five years has been quite high by any standard. Already in 1999, the PA was busy calculating the number of computers that would be needed to reach 20 percent diffusion by 2005,[18] which is a target that was clearly surpassed by late 2004. In any case, Table 1 shows that between 1999 and 2004 computer availability in household grew most, followed by satellite TV as a percentage of TV availability, followed by internet availability at home, and then mobile phones, which were already at a relatively high level to start with. TV availability in households almost stopped growing as it reached its widest outreach, much more than other ICTs. Setting aside growth, and focusing on absolute values, ICT diffusion in Palestine can be divided into at least three categories. The first category includes ICTs which achieved high absolute diffusion levels. This category includes availability of TV at home, which ranks first, followed by satellite TV connectivity, then mobile phone. These three ICTs represent the ones which achieved high diffusion in Palestinian households (ranked in order of outreach). Diffusion of land telephony occupies a middle category, achieving moderate diffusion rates, while diffusion of computers (the fastest growing technology type in Palestine) and internet in households occupies the last category, with moderate and small diffusion levels respectively.

Table 1 can help identify several important characteristics of ICT diffusion in Palestine. First, despite economic hardships, Palestinians have indeed been investing in ICTs, some of which are expensive, according to a general set of societal priorities, which seems to emphasize satellite TV, mobile phones, and, to a lesser extent, general computer ownership. All of these rank above internet use. This is not uncommon; in fact, it is likely to be the same ranking of priorities that we would observe in many other countries. Second, computer growth in households has not pulled internet use with it along the same growth levels, even though computer ownership plays a very important role in overcoming significant barriers to internet use. The ratio of household computer availability to internet availability in households is almost three to one, which is a very high ratio given that the level of internet penetration is now either close to, or even exceeds (due to multiple users on the same piece of hardware), computer penetration in

[18] See PCBS survey for 1999.

many countries with comparable or even higher income. In fact, the Palestinian internet user-to-computer ratio is, surprisingly, among the low ones in the region.[19]

Table 1: Basic ICT Indicators (1999-2004)[20]

	Gaza			West Bank			Palestinian Territories		
	1999	2004	Growth	1999	2004	Growth	1999	2004	Growth
Computer Ownership (% households)	9.6	22.5	134%	11.4	28.4	149%	10.8	26.4	144%
Satellite TV as percent of TVs in household	29.7	77.3	160%	31.4	72.9	132%	30.9	74.4	141%
Internet at home (households)	4.7	7.8	66%	5.7	9.8	72%	5.4	9.2	70%
Availability of Mobile Phone in household	29.8	64.1	115%	51	77.6	52%	43.7	72.8	67%
T.V. in household	82.8	91.2	10%	92.3	94.6	2%	89.2	93.4	5%
Telephone lines (households)	36.5	36.5	0%	45	42.9	-5%	42.1	40.8	-3%

Given that landline diffusion is at 40 percent, users of the internet in Palestine generally regard internet cost to be acceptable and communal use of internet subscription is high, then cost and computer ownership must not be the only main deterrents of internet diffusion in Palestine, at least among a wide enough segment of society that it would be capable of increasing diffusion significantly if it started using the internet. This poses challenges for how we understand the relationship between infrastructure, ownership, and diffusion, which will be discussed in more detail below. Finally, Table 1 shows that there is a clear *principal* "digital divide" between the West Bank and Gaza. The West Bank figures are usually higher than Gaza's, but the divide that these figures convey is not large. This, however, does not represent the only manifestation of diffusion unevenness in the territories. As the analysis proceeds below, it will become clear that there are many other more significant aspects of diffusion unevenness in relation to gender, rural/urban issues, education, and age distributions, which are far more emphasized than the principal divide. These forms of diffusion inequity could be described in many ways and become most observable when the quality of access and use are taken into consideration.

[19] See MADAR Research Journal, v.1 issue zero, October 2002, MADAR Research group, www.MadarResearch.com.

[20] Data from PCBS surveys for 1999 and 2004, respectively.

— Part II —

Measuring Different Types of ICT Penetration

The problems described in the previous sections, in association with how assessment systems evaluate different countries, are also paralleled in how they evaluate different user segments within the same country. More often than not, these assessment systems devise indicators that assume stereotypical use. (This is not to be confused with averaging usage qualities.) Stereotyping users is reflected in "access" and "use" indicators, which tend to equate between many disparate types of "access" and "use" modes: newcomers, irregular users, advanced users, internet addicts, those who access the internet from home, from work, from cafes only, etc. Assessment systems normally report all these disparate use segments collectively in one figure. This tendency represents by far their most significant shortcoming from a policy formulation perspective. In choosing and measuring this one-figure standard assessment, systems often resort to different methodologies, resulting in incomparable figures.[21] This section examines how very crucial differences in modes of "access" and "use" are almost completely ignored by the indicators used in standard assessment systems. It also tries to show that ICT analyses are not as attentive to such very important differentiations as would be needed for good policy making. Without properly accounting for these crucial aspects of access and use, these standard systems would be unable to guide effective policymaking. Such a handicap limits their utility not only in the cases of Palestine, but well beyond.

Different institutions sometimes monitor ICT diffusion or penetration in different ways, and therefore produce occasionally incomparable figures. This is viewed as a problem, and enflames the drive towards standardization that was discussed above. Confusion arises when they ascribe common names to indicators that measure different aspects of ICT penetration. Internet penetration, for example, can be generally measured in terms of the percentage of individuals who have internet subscriptions; users per capita; percentage of households with access to the internet (subscription, computers, and modems); percentage of households or individuals who live in areas in where access is theoretically possible; and so on. These all represent internet diffusion differently. In countries where the internet landscape is very stratified and where communal use is widespread (as "developing countries" are normally assumed to be for example), using any one of the above measurement indicators to represent internet penetration would most certainly produce very different relative representations of the penetration than those which would result from using any of the other remaining indicators. In a country like Palestine, the story that we would be able to construct about internet penetration based on subscription rates would, for example, differ markedly from that which would be based on internet diffusion in households, as discussed below. Differences in stories which would result from such one-dimensional representations of ICT penetration would probably be much less severe in countries that are less ICT stratified and where communal access is less common—"developed countries" are assumed to be of this

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[21] This is a "problem" that standardization projects seek to overcome; see discussion above on the standardization of indicators.

type.[22] This would be the case because the different types listed above would most probably provide stories that are more aligned, as sharing equipment is relatively low while average household size is relatively small. When addressing the problem of measuring diffusion of ICTs, the ITU correctly notes:

> Part of the answer depends on how ICTs are measured. The *conventional* way is to divide the number of *access devices or services* by the total population. While such *per capita* measures are convenient and useful for comparing general differences between and within countries, they can be misleading. This is because a per capita indicator does not reflect the socio-demographic composition of nations.[23]

Usually, when reports make unqualified reference to diffusion they cite statistics compiled in the conventional way described above: in terms of devices or services per capita. In countries where communal access and sharing of ICTs are common, where the average size of the household is large, or in those where a substantial portion of access occurs only in public venues (such as internet cafes or work), measuring ICT penetration in the conventional way, as "the number of access devices or services by the total population," can significantly *depress* total access figures. Moreover, the conventional way is unable to solve many of the problems that it creates by virtue of its very intrinsic logic, such as those evoked by questions like "is a country with fewer telephones but larger households worse off than a country with more telephones and smaller households?"[24] Such a "problem" exists once diffusion becomes formulated in terms of ownership of devices in homes. This problem, again, would be more relevant and more pronounced in relation to the diffusion in ICT stratified societies, and would be less pronounced in cases where access is based largely on ownership of access devices or individual subscription to the service. Thus, in application, the conventional measure leads to many conceptual problems, as described by the ITU:

> [Figures resulting from the conventional way such as devices per capita figures] also fail to take into account the principles of sharing—of telephones in households or of computers in Internet cafés, for instance...They also fail to take into account access to ICTs through the workplace, school or through government initiatives...The lack of detailed breakdown of data provided by per capita measures also make it impossible to set specific targets.[25]

To overcome these problems, in estimating internet penetration, statistical authorities of different countries try to supplement the figures obtained by *conventional* methods with estimates of the actual overall number of users regardless of the type of access. That is, they try to go beyond the number of access devices owned to the total number of users who actually use these devices. Naturally, the best way to estimate the actual number of users from the known number of access devices or services is to survey samples of the community and to use such surveys to compute conversion factors which would relate the number of users to that of access devices, or subscribers, or the number

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[22] Strictly speaking, the use of these types as they often appear in the literature is not intended to reinforce the orientalist occidentalist discourses upon which these assumptions are made. It is only to point to that so-called "developed countries" generally have less unevenness in their ICT sectors.

[23] ITU (2003), *World Telecommunication Development Report*, www.itu.int (emphasis in the original).

[24] Ibid.

[25] Ibid.

of IP addresses which get connected, etc. If they do manage to compute such conversion factors, the authorities responsible for monitoring internet penetration would be always able to estimate the number of users from the number of subscribers, or unique phone numbers connected, etc., which are generally easy to obtain.[26] Unfortunately, many countries do not have the resources to conduct such surveys, and they thus resort to other means to arrive at these conversion factors. But, even when they are measured via "proper" surveys, using these conversion factors is still problematic. User behavior and access patterns change with time and with increased diffusion. Therefore, such a conversion factor needs to be regularly surveyed and updated. After all, internet diffusion tends to be a highly dynamic process—it is commonly portrayed as one that is causing an information *revolution*.

Many countries find that surveying users regularly is difficult and costly. As a result, countries with low income are likely to be forced to adopt other "less reliable" ways for formulating these conversion factors. According to the ITU, "[w]hile most developed nations now have regular Internet user surveys, in developing nations estimating users is usually a matter of guesswork, often based on a multiple of the number of subscribers."[27] Such guesswork has led to many errors in countries where a large portion of the users access the internet without subscription, or without owning the connectivity hardware. When countries that base their internet statistics on estimates do eventually survey internet users at some point in time, they more often than not discover that their estimates were significantly off. It is not uncommon that a survey would suddenly show that the actual total number of users could be more than double the one estimated based on guessing the number of users per subscription.

> A number of other countries that have started to carry out surveys have found that they had hitherto been underestimating the number of people who access the Internet. An Internet survey carried out in Jamaica in January 2003, for example, found that there were almost 675 000 users in the country, more than twice the figure suggested by previous estimates. A similar phenomenon occurred in Peru, with a November 2000 survey finding twice as many Internet users in the Capital (Lima) alone, than had been previously estimated for the entire country...[28]

In one attempt to address this problem, the ITU proposes two other statistical concepts for monitoring the penetration of ICTs in society: *Universal service*, which examines ICT availability in *households*; and *Universal access*, which examines "the level of the population that is covered by ICTs." The use of the household as a unit of analysis in the "service" indicator is noteworthy, as it overcomes some of the problems that arise from using access devices as a unit of analysis. It can avoid some (but not all) of the errors which result from wrong estimates of the actual number of users per dialup or access device. If we were to adopt it, we would compare between ICT diffusion in different countries on the basis of diffusion in households, and compile baseline data within the same country on the same basis (to monitor internal change over time). Yet, even when the unit of analysis becomes the household rather than access devices owned,

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[26] They are easy to obtain because they are technologically determined data that could be automatically obtained from ISPs' log databases.

[27] *World Telecommunication Development Report.*

[28] Ibid.

many conceptual problems still present themselves regarding, for example, communal sharing that transcends the household (the unit of analysis), or the changes that might occur in relation to individualized regular access, which tends to offer more space for skill development than some of the shared access types.

As mentioned before, there are many ways to measure the general penetration of ICTs in a given country, each of which would probably lead to different representations and emphases. The most commonly adopted indicators include measuring ICT penetration by:

- Subscription rate
- Diffusion rate: households which have internet access at home (*Universal service*)
- Penetration: percentage of individuals who use the internet; users per capita
- Penetration among adults: percentage of adults above a certain age who use the internet
- The fraction of population that theoretically has the ability to subscribe; they live in an area where access is possible (*Universal access*)

Assessment systems tend to use one of the penetration indicators above and to ignore the rest. Of these indicators, users-per-capita seems logically to be the one that captures overall diffusion best. It is therefore often monitored and published for different ICTs (internet, mobile phone, etc.). When choosing among the indicators above, the assessment systems are aware of the costly tradeoffs that they need to make. The first point that they typically have to face is the incomparability of the different indicators above, which was discussed before. If a given assessment systems insists on using only *one* of the indicators listed above, as they all tend to do, it will produce ICT representations which are incomparable to those of other systems that are based on using any of the other indicators. The degree of incomparability will depend on the disparities between the above penetration measurement types in the country under analysis. The question which arises then would center on which indicator is to be used.

This leads to yet another problem: the best way to get to the total number of users. It is easy to measure the number of devices which gain access, less easy but quite possible to measure households connected, and much more difficult to get to the total number of users. As mentioned before, the latter would require identifying the number of users per household, as well as the number of users who access ICT services outside the household domain. Such measurements would necessarily require conducting regular and frequent surveys. Assessment systems are therefore faced with an important tradeoff. They must either be content with the easy way to get numbers, which would not account for internet diffusion in stratified ICT societies, or insist on adopting the all-inclusive figures which are not possible to guess without considerable error in developing countries where funding for regular surveys is limited.

By going through the mental exercise of trying to estimate internet penetration in Palestine (in 2004) in per capita terms from the data published by PCBS, it would be easy to demonstrate in rather concrete terms the two main problems discussed above: incomparability of the ICT penetration pictures that would result from using either of the different indicators in ICT stratified cases, and the unreliability associated with the guess work that is intrinsic in preparing diffusion statistics, as they stand now. It would also show how this incomparability and unreliability intertwine with lack of knowledge of important ICT characteristics, and the important gaps that we encounter when analyzing ICT penetration in developing countries.

The latest surveys (2004) show that 9.2 percent of Palestinian households have internet "available at home." However, the percentage of Palestinian individuals (10 years or more) who use the internet goes up to 11.2 percent. Strictly speaking, total internet users-per-capita is not well captured by either diffusion within households, or penetration among individuals above 10 years of age. Thus both figures do not reflect the magnitude of the users-per-capita indicator. Although statistics for the whole population, ones which would include those under 10 years of age, are not currently available, it is safe to assume that per capita percentages of users are less than the percentage of users 10 or above, and are also probably lower than household diffusion because not all household members use the internet in a connected household. Per capita diffusion must therefore be significantly less than 11.2 percent, and somewhat less than 9.2 percent. This is due to the fact that the demography of the Palestinian society is such that the younger the age segment is, the higher its relative weight in population. Therefore, the younger-than-ten age segment must be awarded a higher relative weight than other age segments with a comparable age range. Because the penetration figures in the age segment 10-15 is only 4 percent,[29] it is safe to assume that the age segment below this stands at an even much lower diffusion level; thus, internet use among "below 10 years old" is almost negligible. If a correction value of 0.75 is used (assuming the missing age segment is 25 percent of the population and penetration in it is zero), per capita users could be very roughly estimated at 8.5 percent. However, if we use the difference between the per capita teledensity and the diffusion of landlines per household as an alternative rough guide for this estimation we would construct quite a different story. The ratio between teledensity and per capita landline diffusion is 22:40. Applying this to internet diffusion would mean that per capita internet penetration is slightly over half its per household counterpart figure, which would put internet diffusion at somewhere near 5 percent of the population; again, this is very roughly speaking.

The above exercise shows that it is important to differentiate among the various types of internet penetration which assessment systems are inclined to group together in one number, because the difference between these penetration types reflects important aspects of internet diffusion in Palestine. They can lead to different ICT stories and have much to say regarding our current knowledge about this diffusion. Such differences show that the gaps that are left unaddressed by standard assessment systems can lead us to very different ICT stories once we pay attention to them. The following table summarizes some key internet penetration figures, each of which would most certainly lead to different conclusions if used in isolation from the others.

Number of internet subscribers (year 2000)[30]	7,076, a negligible percentage of population; extremely low diffusion
Diffusion: households that have internet	9.2%; moderate diffusion; relatively high

[29] PCBS survey for 2004, www.pcbs.org.

[30] PCBS (2004), "Palestinian Experience in Telecommunication Statistics," a paper presented to *The World Telecommunication Indicator Meeting*, Geneva. 2004 would probably show larger but still insignificant number of subscribers per capita.

available at home.	given Palestinian income
Adult use: Individuals (10 years or older) who use the internet	11.2%, same as above
Rough estimated of users per capita	Between 5 and 8.5%, very rough estimates each of which would lead to very different interpretations and policy recommendations

Access modes and quality

The distribution of the various modes of internet access and use is another very important aspect related to the general diffusion of internet in society. There are at least three important factors, if not more, related to the issue of internet modes of access that can be useful to monitor in the case of Palestine: venue, regularity of use, and user experience. Internet access can typically take place at home, at work, at school or university, at friends' places, at an internet café or public center, or, as is the case with some people, at a combination of these. This use can be regular (at least several times a week, moderate (once a week to twice a month), or mild (once a month or less). The experience of the user can vary as well: experienced (taken as having used the internet for at least one year), moderate (between a year and six months of use), or newcomer (less than six months' experience). The level of skill developed and sophistication of use—matters that policy makers would need to attend to—would certainly depend on the distributions of access venue, regularity of use, and experience level, none of which is captured in any adequate form in the indicators used by standard assessment systems.[31] Even the substantial list of standalone ICT indicators that the ITU publishes ignores these issues. Lessons learned from how these different types of internet access modes are manifested in Palestine show that building analyses on assuming stereotypical use is seriously flawed.

Policy makers would most certainly need to know the types of user experience being developed in association with internet diffusion in their country. On a very basic level, for users to develop adequate experience for using the internet effectively and efficiently they need to engage in using the internet with some regularity, and to do so for long enough durations to develop needed skills. That is, setting side the influence of class, profession, educational background, and past computer experience on internet skill acquisition, the skills developed to use the internet should (logically speaking) at least depend on the average number of internet sessions per week, the average duration per session, the tasks performed when logged on, and the average total life of internet use. Unfortunately, general diffusion indicators tend to conflate use segments of very different qualities and regularity of use in single diffusion and use figures. They therefore do not set proper criteria to differentiate between diffusion segments that would indicate different use qualities and skill levels. Thus, these general indicators are of limited utility for policy making as they count newcomers, dropouts, mild users, and frequent users together in one figure.

[31] MOSAIC is the only system that addresses sophistication of use in some way. However, the way it addresses it is still very vague; different researchers would most certainly arrive at different conclusions. To understand their methodology, see their publications available at http://mosaic.unomaha.edu/Pages/mosaicgroup.html.

The last survey conducted by PCBS has data that point to this problem in several ways. When asked whether they used the internet in the past month, two to three months ago, etc., users gave revealing answers. Table 2 summarizes the territories' percentages for every period of time.

Table 2: Percentage Distribution of Households which any Member of the Household Use the Internet by Period of Time[32]

Period of Time	Palestinian Territory
Less Than One Month	84.9
2 – 3 Months	76.2
4 – 6 Months	65.5
7 – 12 Months	58.9
Before One Year	52.7

Table 2 shows that only 84.9 percent of the households with internet users have users who actually used the internet during the previous month. This indicates that almost 15 percent of the household users have not used it for almost a month when the survey was being conducted, and are therefore not regular users even though they have it at home. On the other extreme, almost half the users had not used the internet until less than a year ago. Thus, half of the household users seem to be newcomers who have not known the internet for much over six months and have therefore probably not developed very sophisticated internet skills yet, or use it in high value added operations. This is also substantiated by the fact that percentages rise rapidly as the recentness of the period draws nearer. There are therefore many newcomers grouped together with experienced users as well as irregular users grouped with regular ones in this overall diffusion figure of 9.2 percent. This deficiency is even more pronounced when the unit of analysis is changed from users in households to adult users who are 10 years or older. The percentage of the users who have not used the internet for a month rises to 20 percent of the total, whereas the number of experienced users drops slightly, as indicated in Table 3.

Table 3: Percentage of Persons (10 Years and Over) who Use the Internet by Period of Time[33]

Period of Time	Palestinian Territory
Less Than One Month	79.0
2 – 3 Months	68.8
4 – 6 Months	62.4
7 – 12 Months	53.3
Before One Year	51.6

The use quality will probably also depend on the venue of use. That the data show that regularity and experience of use seem to actually *drop* as we move away from household based access to overall individual (adult) access shows that perhaps some of

[32] PCBS survey for 2004, www.pcbs.org.

[33] Ibid.

the public modes access offer fewer opportunities for regular use and experience development. This, by logical extension, would show that public access, as it is now in Palestine, is less capable of promoting the acquisition of sophisticated skills. Therefore, to focus on studying the different modes of public access is crucial for understanding the effects of internet diffusion in a case like Palestine. The place where users access the internet most can be used to indicate important aspects of use quality that are related to access venue. It is possible to differentiate between at least two sets of "use" quality types, based on the place used "most frequently" for using the internet. Work, university, and home can all be very roughly considered to offer use environments that offer enough regularity and longevity that are more conducive to the acquisition of sophisticated skills and higher value added operations with time. Cafes and "a friend's place" are probably less conducive. Naturally, this assumption is a rough approximation and cases which breach it are very possible to imagine—some people, for example, can access the internet at friends' places more often than other people who use it most frequently in university.

Table 4: Place of most frequent Internet use in percentage of Internet users[34]

Place of Usage	Palestinian Territory
Home	38.4
Work Place	11.5
School\ University	11.0
Internet Cafes	31.8
Friend's Home	5.2
Other Places	2.1
Total	100

Although "home" represents the most frequently cited place for internet access in Palestine, "internet cafes" are a close second. In fact, around 40 percent of users tend to access the internet most frequently in places that might not be best suited for high quality use, skill development, and high value added (cafes, friend's home, and other). These places commonly offer limited use duration and would probably produce lower quality users, although these assumptions still need to be validated.

In any case, overall general diffusion rates do not segment diffusion by quality or access venue, and empirical data for different countries that would help us test these assumptions are wanting. However, PCBS pays some attention to this point and collects important data on access segmentation and quality. The data collected and detailed above show that perhaps the reason why use regularity and experience drop as we move away from household based access to individual access is probably related to public access, and maybe specifically to access based on internet cafes. This, however, cannot be validated with the data that we have, nor can we really validate that regularity and experience are necessarily directly related to the acquisition of sophisticated skills. Yet, it is precisely because we cannot affirm any of these assumptions with some confidence that we need to judge the indicators used as seriously lacking. General numbers could mean anything. Assessment systems assume stereotypical use, an outlook which prevented them from

[34] Ibid.

developing indicators that would address use quality, regularity, experience, and so on. We therefore would not be able to assess this aspect of the diffusion properly if we hold such views or cherish these systems. We can either assume that it is not important and proceed with the assessment, or assume that it is important and proceed with our assumptions about it, where different assumptions would necessarily lead to different conclusions and policy recommendations. This paper chooses the latter position, and the assumptions made here were stated before: internet diffusion that is dependent only on internet cafes is less capable of promoting sophisticated use; it is one of the main reasons why diffusion in Palestine is so volatile. This is based on a special reading of PCBS' empirical data and cannot be reached in any way by using standard international assessment systems.

Even though the use of internet cafes could be intuitively framed as a mode of access that does not produce sophisticated and regular users in the long run (an assumption which remains to be validated), it is still nonetheless one of the most important access modes in situations where digital inequity prevails. It helps overcome many access barriers related to ownership. Whether it is to be encouraged, improved, or discouraged in favor of private access are all matters for local policy. But authorities need first to study it as a separate entity before they can proceed to promote or regulate it. In doing so, they will need to look beyond the assessment systems available. Regarding cafes in particular, policy makers are forced to formulate strategies that would address that although internet cafes may perhaps not be the best venues for producing digital skills (if that is indeed confirmed) they still enable disadvantaged users to overcome important access barriers. Moreover, although internet cafe use is big in Palestine, the segment of disadvantaged users is huge; café use is still comparatively lower than in many other countries. Cafe based access in Palestine is in fact at a moderate level and can increase significantly. The number of internet cafés in Palestine dwarfs when compared to Morocco, where the government enthusiastically promotes internet cafes. The number of cafes per capita in Palestine is also much less than those in rich Gulf countries, where, even though private access is relatively widespread, public access is still also relatively high.[35] It is, however, most certainly higher than in a country like Egypt, for example,[36] where the government focuses on enhancing ownership-based access. So, regarding café based access, Palestine seems to be positioned in the higher half of the internet café Arab countries ranking list.

By digging into a group of indicators that would not typically be promoted by standard assessment systems, we can conclude that what we see in Palestine is probably a relatively wide diffusion that seems to include high portions of volatile and inexperienced use, and which is also one that has moderately capitalized on the opportunities provided by internet cafes (see discussion on infrastructure below). Internet cafes seem to be removing barriers and prompting volatile use. To reach these conclusions we had to look outside standard indicators, but to get to a more accurate picture we have to invent new indicators and compile data based on them.

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[35] The number of internet cafes per 100,000 inhabitants in 2002 was 1.76 in Palestine; 10.13 in Qatar; 13.24 in Bahrain; 13.21 in Libya; 6.92 in Morocco; 0.56 in Egypt. See *MADAR Research Journal*, v.1 issue zero, p5.

[36] Ibid.

One can start to propose reasons as to why diffusion went up to these high levels at this somewhat low use regularity and experience level, and why the level of using internet cafes in Palestine is relatively moderate and not high or low. Because adequate comparative data are lacking (after all, such data are not really recommended by any of the standard assessment systems available) it will not be possible to anchor any explanation made here in comparative terms. A plausible explanation would be that internet penetration was forced to grow quickly by social needs related to military occupation, to having to cope with Israeli brutality, and to the fragmentation and dispersion of the society. That is, the internet was used to fill crucial immediate communication needs against extremely powerful and unique barriers that the Palestinians face. However, this specific mode of internet diffusion does not reflect any level of sophisticated and regular use because it was pushed and rushed by the force of this enormous need. Another reason may be that formal support institutions were lacking. Thus, perhaps the same factors that made internet diffusion reach relatively high levels in the case of Palestine could also be responsible for its lower experience and regularity levels. The problem, however, is that we cannot currently explain the diffusion due to a lack of relevant field studies. We can only speculate and search for answers.

In any case, what really matters here is that analyzing aspects of use venue, regularity, and experience are all crucial to any sound policy making. They draw pictures of internet diffusion that are very different from just saying 9.2 percent of households access the internet. They are, however, almost totally ignored by all of the assessment methodologies under analysis, which represent these different diffusion types in aggregated form. But surely 9.2 percent diffusion in households, as is the case in Palestine, can have many faces. It can be a half experienced 9.2 percent or only a quarter so. A 25 percent increase in the next year could be composed of regular users or only ones who occasionally log on to the net. Alternatively, a 25 percent growth rate could actually be the net of 35 percent newcomers and 10 percent dropouts. Which is better: a country with smaller regular and experienced diffusion or one with higher and irregular one? Once we start looking inside the aggregate number, this question almost certainly follows. The ITU poses a similar question regarding the diffusion of phones: "is a country with fewer telephones but larger households worse off than a country with more telephones and smaller households?"[37] This question is impossible to answer. It is too subjective, and is based on the problematic ranking logic that dominates ICT country assessments. Such logic is partly responsible for why we don't look inside these numbers, and why, in the cases where segmentation statistics, are available we have no means to integrate them in the framework of the standard assessment systems. Put concisely, this paper does not sympathize with what is the better type of question, suggesting instead a focus on how things are, and in what directions they are moving. This will facilitate the development of good policies. What the policies have to achieve is not for external international statisticians to decide upon in advance. It is to be decided on a case-by-case basis, and at the local level. Assessing internet diffusion in Palestine should pay more attention to the statistics available locally and not constrain itself by being totally guided by international indicators. Surely the fact that PCBS has provided the data which add to our understating of the somewhat volatile nature of internet diffusion in Palestine would

[37] *World Telecommunication Development Report.*

help telecom authorities develop much more realistic policies and strategies in accordance with their objectives.

People use the internet for different purposes and for different durations. Very short durations would imply either low need for the internet, the presence of strong barriers to access, the purpose of using the net is of limited scope, etc. Short durations would also probably indicate low skills development. As with other important sub-diffusion features, standard diffusion indicators fail to account for the distribution of different use durations, for the reasons why people use the internet, and for how these qualities are distributed in society. To assume that durations, purpose of use, venue, regularity, experience, and quality of use, are related issues is only logical. That all assessment systems ignore these issues reflects not having a proper "user focus." Whereas most assessment systems are likely to account for "the market," policies, infrastructure, etc., they all ignore what the internet is mostly beneficial for: users.

Unfortunately, the data provided by PCBS in this regard are not reliable. They can't be used to fill the gaps left open by international assessment systems, as was done before with access venue and regularity of use. What PCBS proposes regarding how users rank their purposes for internet use is not really in harmony with what these users say regarding the duration of time that they dedicate for each of these purposes. They often give relatively too high durations for tasks which they originally ranked as of relatively low priority and frequency of use. This seems to have been caused by choosing an inaccurate question in the internet survey, which requires respondents to say how much time they spend for a given purpose of use. That users would give confusing responses to such a question is natural—another indication of how practical consideration can indeed affect the data that we get in important ways. Similarly, when measuring the purpose of use, PCBS asks the respondents to choose from a set of different possible purposes for using the internet: from chatting to work. This is a very difficult question to answer. It forces users to think of the proposed purpose types as if they were mutually exclusive, to respond according to their own definitions of what each purpose types might mean, which does not have to necessarily coincide with the assumptions of the survey, or with those of other respondents. Alternatively, respondents might not be able to fit their opinions about why they use the internet under one of the types offered. Because this question lends itself to very subjective interpretations, it would be more productive to tackle this issue in the future by starting with qualitative research. After understanding why people generally use the internet, questions which perhaps ask the user whether they use Google, read the news over the internet, have bought anything online before, etc.—that is, questions which focus on specific activities—can be surveyed, and the answers would be related to use categories upon which sound policies can be built.

This section explored some of the most important shortcomings of standard assessment systems: it ignores important user differentiations and use qualities. In a case like Palestine, ignoring the user in favor of the businesses is simply not constructive. The pictures which are business and infrastructure centric will not help explain why ICT is used in Palestine and how to build a better ICT sector.

Infrastructure

Infrastructure is usually measured in terms of the extent of the national network: its capacity, the nature of its switches, the band width, the presence of national exchange, how much traffic the infrastructure can bear, and data traffic, among others. The obvious assumptions upon which infrastructure indicators are based include state sovereignty, clear demarcation of the nation-state, ownership of access devices, and that a larger infrastructure will promote and enhance diffusion proportionately. In the case of Palestine almost all of these assumptions are either invalid, or not in line with the assumptions that the standard systems make. The challenges that the nature of the Palestinian lack of sovereignty and its unique demography impose on these assumptions will be discussed later. This section will focus instead on the widespread assumption that enhancing the infrastructure leads to higher diffusion. Even when such an assumption is not explicitly mentioned, it is still clearly implied and guides many policy orientations.

In 1999, PCBS conducted a large survey to measure the diffusion of various ICTs in Palestine. After measuring many aspects related to the diffusion of ICTs, PCBS made one policy calculation. It tried to estimate the number of computers needed to nearly double the computer diffusion (i.e., to reach 20 percent) by 2005. This seemed like the logical policy recommendation to make. If the diffusion of computers would double, the most significant aspect of the ICT status would double as well. Many experts would readily extend this logic to the internet: increasing computer diffusion is the best and most certain way of enhancing internet diffusion and bridging the digital divide.[38] Further extensions to the whole infrastructure are also logical. After analyzing the statistics published by PCBS, this paper concludes that this view is very limited in scope and does not necessarily represent the best or only way to plan for internet diffusion in Palestine. Its main flow lies in its assumption that increasing ownership and network capacity is necessarily the most important factor in increasing diffusion. Whereas there is no doubt that increasing the capacity of the national network, its reach, and its quality, as well as and computer ownership, are all very important factors that support higher internet diffusion, there seems to be another set of crucial factors that such a view usually hides. This brings the discussion again to issues of ownership, communal or public access modes, and why people use or do not use the internet or other ICTs. All of these issues have important ramifications on infrastructure related policies.

The way we regard the relationship between diffusion and device ownership bears grave consequences on how we would view "proper" ICT policymaking. Generally speaking, as noted in previous sections, a country like Palestine is expected to feature much communal and public access. This is statistically true where they represent significant portions of access in Palestine (40 percent of "most-use" venues are not households or work—even though work is till public). However, what seems to be rather puzzling from a standard assumptions point of view is the fact that the number of households that have internet at home are slightly over a third of the number of households that have computers at home. Therefore, whereas a large portion of the users are stifled by lack of ownership and would benefit from increased ownership and others from an expanded infrastructure, a perhaps equally large portion owns a computer but does not use the internet. Moreover, roughly 40 percent of the households have telephone landlines at home. This shows that there is probably a very large portion of *potential* internet users who have both the hardware needed for connectivity and the networking

[38] Briges.org categorizes this point of view as "e-readiness equals computers and access" and that the solution which emanates from this perspective is to supply the people with more computers. See bridges.org (2001), *Comparison of E-readiness Assessment Models*, p12.

ability readily available. Both ownership and infrastructure cover them well, yet they do not use the internet. The current state of the infrastructure and the diffusion of access devices in Palestine can indeed accommodate many more users. The point being made here is that the number of Palestinians connecting to the internet could be increased significantly within the same infrastructural capacity—without much network or device investment, and without even needing further computer ownership. The current network capacity is much larger than the current level of diffusion, as attested by the diffusion of landlines and computers.

It therefore does not seem that either cost or availability of technical equipment represent the main deterrent for not using the internet for at least a sizable portion of society. So, for this segment, deterrents must be somewhere else. Another possible deterrent for this quite sizable segment might be that awareness of the internet is low or that basic skills needed for using it are lacking. Again, that internet awareness and use of computers are relatively much higher than actual internet use (PCBS shows that only 33% of the computer users in Palestine use the Internet) would imply that the levels of such awareness and basic skills are not really the main deterrent for this sizable segment either (but only for this segment of course). Their main deterrent must be somewhere else.

It is not possible to verify here the reasons why this specific segment does not use the internet; perhaps it relates to not needing to use it because it might not be fulfilling valued functions. PCBS surveyed reasons why people do not use the internet, but the published data mix at least two very different social segments: those who have the capacity—and they are substantial—and those who are denied access because of cost, ownership, lack of skills, etc.—and they are even more substantial. Because the published data mix both, they does not really tell us why the different types of people who have the skill, awareness, and access at home do not use the internet. This, if anything, shows an important flow in understanding users' segmentation. What is very clear, and remains to be explained, is that the infrastructure and hardware requirements are much more than the current penetration levels would assume, and that there is great potential for increasing internet diffusion in a large segment of society without large investments. But more importantly, this story would be completely hidden if one relies on the assessment systems under analysis, even though they represent crucial aspects of policy formulation. Without knowing them, proposed policies might center on increasing the size of the network, which would indeed address disadvantaged people, and is surely a positive policy to undertake, but still would not deal with why advantaged ones do not log on.

The situation is also not so black and white in the case of public access via internet cafes. Cafes are good tools to help the disadvantaged make some use of the internet. Palestine has a large internet café user segment, but comparatively less than many Arab countries. That is, its capitalization on internet cafes to provide access to the disadvantaged is only moderate. The intuitive assumption would have been that in a country like Palestine, where poverty is prevalent and communal access is already present in other forms, public and communal access modes would be among the highest in the Arab region. This does not seem to be the case. Perhaps this is because public access is costly; perhaps there are other reasons. Unfortunately, there is little data by which we can ascertain this or search for other reasons. Again, users are mixed.

To sum up, infrastructural aspects in Palestine show that ownership-based diffusion is underutilized, especially in relation to other countries. Alternative modes of public access seem to be somewhat relatively underutilized as well. Palestinian policy makers therefore have much to gain if they switch their focus from one that tries mostly to increase the size of the infrastructure to one which tries to utilize the existing one more fully, as well as increase it. There is also ample room for improving public access possibilities.

Standard assessment systems provide some useful indicators for monitoring the quality and capacity of the network. They would become more even more useful if monitored on a per user segment when applicable. These indicators include:

- Total capacity of local public switching exchanges
- Percent of main lines connected to digital exchanges
- Percent of main lines which are residential
- Percent of DSL internet use (even though this is an access indicator it is better used here as an infrastructure one, and focusing on the access modes that are not technology based)
- Waiting list for main lines
- Faults per 100 main lines per year
- Percent of telephone faults cleared by next working day
- Local telephone traffic (minutes)
- Fixed to mobile traffic (minutes)
- Dial-up internet traffic (minutes)
- Public data traffic (non-internet)

These indicators were selected form the ITU's list of the 50 key indicators, and they cover the infrastructure indicators of the assessment systems under study. Generally speaking, the different assessment systems use some of these indicators but not all of them and put them under different categories: readiness, infrastructure, infostate, etc. This paper proposes that they be used as infrastructure indicators, and be used with caution. Palestine is not a sovereign country. The Palestinian network is in reality nothing but a sub-network of the Israeli network, and Palestinian ISPs are in practice retailers for Israeli ISPs.

Sovereignty

ICT assessment systems are all designed to evaluate the diffusion of ICTs within a sovereign nation-state, or within entities that lie within a sovereign nation-state. Palestine is neither a sovereign state nor a nation that lies within one state. Both the status of being colonized (not just occupied), which defines the Palestinian territories, and the peculiar nature of its diasporic demography are unique to Palestine. Both also pose many challenges for the application of ICT assessment systems.

The situation in the Palestinian territories has thus always been marked by conflict and deterioration. This resulted in the creation of various grades of pseudo Palestinian-sovereignty arrangements, and the development of different "modes of operation" by the Israeli military occupation. Prior to 1994, for example, the territories were fully occupied by Israel and did not enjoy any forms of practical or nominal sovereignty. It was a colonized area in every sense, and Palestinian authority never extended beyond partial municipal politics. The situation was therefore clear, on all levels of analysis. This phase ended with the first *intifada*, and was later moved with the rise of "the new world order" into a phase of negotiations in the Madrid conference of 1991. Since 1994 and until 2000 the situation changed in many ways. The territories were considered to be under the PA's partial administrative authority; parts of the West Bank and Gaza were freed from *direct* military occupation. While under the administrative power of the PA, they all remained within the frame of Israeli occupation and power. After the year 2000, the territories became fully and directly reoccupied by Israeli military forces, much of the PA's institutional setup and assets were destroyed in the process, and the PA was reduced to a dysfunctional body that commands loose security militias of limited influence. Some of the limited practical political power of the PA was pulled away by different Palestinian political and military resistance movements, at least in parts of the territories.

ICT diffusion was significantly influenced by these changes in sovereignty levels and modes of occupation in the area. Although the territories were never really under Palestinian sovereignty, it is important to note that the administrative presence of the PA between 1994 and 2000—even though under Israeli military occupation—did indeed reflect positively on ICT diffusion. Teledensity statistics (landlines per 100 inhabitants) carry this out, as discussed before. Teledensity, which until now remains to be the backbone of internet diffusion in the area, was negligible prior to the creation of the PA. Israeli forces of occupation kept it low, which harshly stifled its diffusion. Israeli occupation did not invest in network development, prohibited some services (such as faxes, which Palestinians were normally not allowed to own under Israeli occupation), and maintained very long service waiting lists. A report by the ministry of communication and information technology correctly summarizes the situation in the telephony sector before the creation of the PA as follows:

> [Teledensity] never exceeded an average of 3.14% in the West Bank and Gaza, whereas in Israel it stood at 30%. The waiting time required to obtain a telephone line from the Israelis was no less than 10-15 years! Often, the use of fax machines and other forms of communications were banned. The lack of Israeli services in Palestine, and their disinterest to develop the telecommunication network left this sector in its primitive form.[39]

Under the PA, and because of the authority's efforts to improve and expand the network, teledensity grew rapidly starting 1997, reaching almost 9 percent and covering 90 percent of the territory by 2000.[40] That is, it almost tripled in the few years in which the PA was functional. This confirms the negative influence of Israeli occupation, and the positive effects that creating the PA had on ICT diffusion. Ever since the Israeli reoccupation of the territories at the end of the year 2000, teledensity has stopped increasing and hovers around the 9 percent rate.[41]

However, even though the creation of the PA did reflect positively on ICT diffusion, the current mode of Israeli occupation and the lack of true Palestinian sovereignty over the territories remain the most important deterrent for further ICT diffusion progression and improvement in service types and quality. That Palestine can communicate with the world only via Israel and generally has no say in its international connectivity, and that it is not allowed to manage its local communication wavelength

[39] Palestinian Ministry of Telecommunication and Information Technology (2003), *Palestine Paper for the World Summit on the Information Technology.*

[40] Ibid.

[41] Ibid. Note that there are discrepancies between the values given by the ministry and those published by the ITU. However, these discrepancies would not affect the conclusions made here in significant ways.

spectrum—with or without the reoccupation of year 2000—are but two examples of this negative external factor's impact on ICT diffusion. Accordingly, the situation can be summarized as follows: ICT diffusion benefited from the administrative arrangements between Israel and the PA, and therefore grew relatively rapidly during the PA's time. It soon reached its structural limit, which cannot be crossed until the PA enjoys true sovereignty. The creation of the PA therefore partially opened gates previously to ICT diffusion, but was not able to open it as wide as needed. Moreover, the political conditions of occupation and colonization, which prevail in Palestine are clearly the most important determinant of ICT diffusion in Palestine, which is hardly surprising given that the politics of colonization shapes all conditions there.

Lack of true sovereignty and the actions of Israeli occupation now negatively impact ICT diffusion and put many obstacles in the way of ICT progress. Examples of this are many, and are described in a paper prepared to The World Summit on the Information Society by the Palestine Ministry of Telecommunications and Information Technology:

- **Direct destruction:** Israeli forces frequently destroy and confiscate ICT equipment including governmental computers, private computers, radio and TV broadcasting units, and communication towers.
- **Preventing and delaying deployment of needed equipment:** Israel does not allow Palestinian institutions to import needed telecommunication equipment, confiscates some of the deployed equipment, and delays the deployment of those approved.
- **Preventing direct access to the international network:** Israel prevents the PA from establishing independent international internet and telephone phone connections. All forms of Palestinian connectivity to the outer world have to pass thorough Israel.
- **Confining ISPs:** Palestinian ISPs are connected to the world only through Israeli ISPs. They are therefore to be considered as mere retailers for Israeli ISPs, and as a result are not likely to develop sophisticated operations. Moreover, this puts all of the Palestinian internet traffic at the mercy of Israel and under the eyes of its surveillance.
- **Controlling the Palestinian frequency spectrum:** Israel allows the PA to use but a limited portion of the local frequency spectrum available for communications.
- **Preventing national exchange:** internet communication between different and fragmented areas of the territories—that is, internal exchange—is performed through Israel.
- **Invading Palestinian market:** the PA is in no situation to protect its market and enforce its rules over the little area that it controls. This is clear in the case of mobile phone services. Despite the fact that the Palestinian diffusion in this regard is relatively large, the sole Palestinian provider, Jawal, has a small market share of its own local market, in which it is supposedly a monopoly. Israeli companies illegally sell tax free services inside the territories, which Israeli networks cover. Agreements between PALTEL and the PA were therefore not possible to enforce and the company loses important revenue needed for future development.

Because of the serious implications that lack of sovereignty poses in the case of Palestine, many modifications need to be made when using standard ICT indicators for assessing diffusion. Not all of the available policy indicators are adequate simply because the PA cannot enforce any type of policies that it so wishes and does not control many of the main structural parameters involved in developing and applying sound policies. In a case like Palestine, these parameters are external factors but they are normally assumed to be internal in policy indicators. Similarly, some of the infrastructure indicators can't be used as is, because the Palestinian infrastructure is not independent and is highly controlled from outside. Again, factors assumed to be internal by standard infrastructure indicators are also external in the case of Palestine. In application, the Palestinian network is only a partially autonomous part of the Israeli network. Whereas some infrastructure indicators are useful to monitor, those based on assuming full sovereignty are not very relevant to Palestine. These include international bandwidth, number of ISPs, and the presence of a *national* exchange.

Demography and Distribution

Lack of sovereignty is not the only aspect posing challenges for ICT assessment in Palestine. Palestinian demography also poses many important challenges that standard ICT assessment methodologies do not normally address. The Palestinian society is divided between a colonized homeland and the diaspora, possessing the largest and oldest unresolved refugee problem. It also represents one of the most rapidly growing populations of the world. Whatever the reason has been, the Palestinian society is now fragmented, growing rapidly, has a relatively very larger composition of youth, and is divided between different geopolitical units where Palestinians have different citizenship statuses and rights. These unique characteristics have many methodological implications for ICT diffusion assessment.

Because of historical events and the experience of disprsal, Palestinian society is now segmented into different groups. A section of the society, roughly 1.3 million people, is composed of Palestinians who live in Israel (including occupied Jerusalem) as second class citizens. These Palestinians live either in their original hometowns or as internally displaced people who remained inside areas occupied and annexed by Israel in 1948 and 1967. Another section of the society, roughly 3.5 million people, lives in the remaining West Bank and Gaza. Almost half of them are Palestinian refugees who were originally expelled by Israel from other parts of Palestine—mainly during 1948. They are now formally 1948 refugees displaced inside the territories that were occupied in 1967. Outside historical Palestine, almost three million UN registered refugees live in neighboring countries, mostly in Jordan, Syria, and Lebanon. Many of these refugees have no formal citizenship rights in any country. These do not account for all of the expelled Palestinians. Some of those expelled managed over the years to acquire citizenships of foreign countries, including neighboring Arab countries such as Jordan, and stopped registering themselves as refugees with the UN. As a result, UN statistics do not account for them, even though they represent a significant portion of the Palestinian people in the diaspora. The real number of diaspora Palestinians is thus much larger than those conveyed by UN figures. Finally, in the face of the harsh realities in the territories, and a reflection of those seeking work and income, Palestinian migration from the West Bank and Gaza has continued after 1967.

The demographic situation in the territories is now too complex to be analyzed in ways essentially developed for analyzing typical nation-states—as ICT assessment frameworks tend to be. Setting aside the sovereignty problem, taking the territories as an independent unit ignores that it is part of a society fragmented among several countries, is internally displaced in the territories and in Israel, and includes people who are not citizens of any country. This could undermine very important roles that ICT plays in maintaining this society. The Table 5 shows the numbers and distribution of UN *registered* Palestinian refugees in neighboring countries and in the territories, as per the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA).

Table 5: Total Registered Refugees per Country and Area as at 30 June 2003[42]

Location	Persons	Families
West Bank	654,971	143,562
Gaza	907,221	194,802
Lebanon	391,679	96,521
Syria	409,662	94,973
Jordan	1,718,767	317,177
Agency Total	4,082,300	847,035

Table 5 shows several key features regarding the magnitude and distribution of registered Palestinian refugees. There are roughly as many *registered* Palestinian refugees outside Palestine as there are Palestinians (refugees or not) in the territories. If all of the Palestinians in the diaspora, regardless of whether they are registered with the UN as refugees or not (between 7 to 8 million people according to some estimates), are compared to the population of the West Bank and Gaza, the majority of the Palestinian people will turn out to be living outside the territories due to expulsion.

If we take the society of the West Bank and Gaza as a unit for analysis, as it represents the focus of this paper, several important features stand out. Refugees now account for "29 percent of the West Bank population and 65 percent of the Gaza Strip population."[43] Moreover, because the majority of the Palestinians have been expelled from their land, kinship links tie many Palestinians in the territories to other countries. "Whatever its causes...as much as 57 percent of households in the West Bank and Gaza Strip have relatives abroad."[44] Both Palestinian sides of these trans-nation-state kinship relationships are normally prevented from direct personal communication with each other for political reasons. Current transnational modes of remote digital communication are therefore crucial in maintaining these relationships and are well served by ICT.

The population in the territories is also characteristically one that is growing very rapidly. In fact, the Palestinian population growth rate is one of the highest in the world. Palestinian refugees who live in camps in neighboring countries share this characteristic

[42] United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), available on www.un.org/unrwa.

[43] Pederson, Jon and Sara Randall & Marwan Khawaja (eds.) (2001), *Growing Fast: The Palestinian Population in the West and Gaza Strip*, Fafo report, Fafo Institute for Applied Social Science, p 17.

[44] Ibid, 18.

with their fellow Palestinians in the territories.[45] This high population growth rate overburdens the resources of the West Bank and Gaza, a matter that is expected to become only more emphasized with time.

> Thus, by 2010 one may expect a population in the West Bank and Gaza Strip of about 4.4 million, assuming a slow fertility decline (30 percent and 12 percent in the West Bank and Gaza, respectively). Even with a faster fertility decline (44 percent and 33 percent), the population will reach 4.2 million. Barring large-scale out or in-migration, a larger or small population is not very likely.[46]

The high growth rate results as well in a population distribution that is strongly skewed towards younger age segments and lower ratios of adult income earners per population. When the influence of current net migration—out of the territories, even if small—is factored in, the concentration of the population within young age segments becomes even more emphasized. This brings about important negative economic effects due to rising dependency ratio. As put by an Institute for Applied Social Science report (Fafo), "[t]he impact of migration is also visible in the age structure of the population. In particular, there are too few adult men compared to a population with stable fertility and mortality rates and no migration."[47]

The demographic characteristics surveyed above, in combination with other sociopolitical factors, present important challenges for assessing ICT diffusion in Palestine. First, in the case of Palestine, penetration rates need to be assessed alongside age segments if they are to be of relevance. If overall internet penetration in society is not very high, when in fact it is strongly concentrated in younger segments (which tends to be the case in Palestine), then the implications for the future in a country like Palestine could be more positive than, for example, a much lower concentration of internet use among young age and higher diffusion rate. Accordingly, segmenting diffusion rates along age groupings is important in studying the case of Palestine because overall non-segmented penetration rates are only partially reflective of internet diffusion in the country and might lead to erroneous conclusions based on typical distributions. PCBS takes this factor into consideration but standard assessment methodologies do not; they suffice with per capita figures. Similarly, difference in ICT distribution between refugees and non-refugees. It needs to be added to customary distribution measurement indicators which normally focus on urban versus rural, gender distribution, geographical, etc.

Second, the demographics detailed above show that the territories represent a small area with much connection to the outside, both to the region and to other areas where diaspora Palestinians are concentrated. This characteristic affects ICT diffusion in many ways. Analyzing regional ICT content, websites or satellite TV channels, for example, has direct relevance for the territories. They are better considered as direct factors, not as influential external factors. The most popular TV channels in the territories tend to be regional satellite channels. These channels act as ICT enabled modes of cultural reproduction and service. Thus, to judge Palestinian ICT content by resorting only to local content would be highly misleading. The situation regarding the internet is not much different. Much of the web's Palestinian content is developed and maintained

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[45] Ibid.

[46] Ibid, 19.

[47] Ibid, p18.

by the Palestinians of the diaspora. Accounting for the impact of Palestinians in the diaspora on ICT diffusion in the territories is therefore relevant for contextualizing the situation in the territories. Not surprisingly, the Palestinian government—the leaders of which were mostly in the diaspora until 1994—tried to use this to enhance Palestinian ICT diffusion. It proposed in one of its ICT initiatives to create networks to link between diaspora experts and local the ICT community to help transfer "know-how". The effectiveness of such initiatives can be monitored using special statistical concepts which will need to be invented specially for Palestine: magnitude of diaspora expertise devoted for ICT improvement in Palestine as a percentage of total diaspora expertise available or similar measures.

The demographics of the Palestinian society show that due to the fragmented structure of the society and daily Israeli inflicted confinement on traditional modes of communication and transportation, many ICT features which could be considered luxuries for countries with comparable low income are better regarded as necessities in Palestine. Assessments of ICT diffusion in the territories need to address this unconventional structure of Palestinian society and evaluate the type of benefits that ICT delivers within such a context that results in uncommon distribution patterns.

Other ICT distribution indicators include class, gender, age, geographical dispersion, urban versus rural, type of education, and profession. Only distribution by gender and, sometimes, geographical dispersion are proposed by standard ICT assessment systems. PCBS monitors more distribution indicators: age, rural-urban, professional background, and education. When it comes to education, standard assessment systems account for various educational indicators, such as enrollment in various stages of school education, but they don't investigate how internet diffusion is distributed within them. A few of these systems also try to address matters related to the quality of the educational system (such as NRI), while the majority focus on overall enrollment figures.[48] Sartawii shows that overall enrollment figures can be misleading. In Palestine, these figures would not properly account for the poor ICT quality content in the educational system.[49]

As a final note, the importance of all of these distribution indicators is self-apparent (including those promoted by PCBS), and without them proper policies would be difficult to formulate.[50] Distribution of ICT ownership and use in society is not properly addressed in assessment systems. These systems focus too much on overall use indicators and ignore the inner segmentation of such penetration. Distribution modes—geographical, age segments, urban-rural, refugee-non refugee, gender, income brackets, educational background, type of work—are all very important aspects that any sound policy making must consider. They are also aspects that standard indicators tend to ignore. PCBS collects many useful data types, which can help fill the gaps left by standard assessment systems. The indicators used by PCBS could be improved by resorting to qualitative research that would be conducted to identify which questions would best capture these qualities.

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[48] NRI tries to tackle the issue of quality in education alongside the normal enrollment indicators by focusing on the quality of math education.

[49] See Sartawi, Badie (2003), *Profile of the Information society in the Palestinian authority*, United Nations Economic and Social Commission for Western Asia (ESCWA).

[50] Values of the different diffusion patterns are given in PCBS survey report of 2004.

ICT and Development in Palestine

As mentioned before, the publicized motive behind promoting the diffusion of ICTs in society is developmental.[51] ICT is supported and indeed hailed for its supposed developmental impact, and specifically its ability to enhance productivity and economic growth. The World Economic Forum (WEF), for example, defines NRI as a measure of "the degree of preparation of a nation or community to participate in and benefit from ICT developments"[52] where seeking ICT development is based on the widespread premise that ICT development "is seen as an important," if not a crucial, "enabler of productivity and growth."[53] In other words, the ultimate motive is economic development, and particularly growth.[54] Most IOs therefore publish ICT reports that identify important development trends and promote specific "best practices," which are usually presented as development manifestos for bad scorers. As a result, many indicators were developed to measure elements of such preferred "developmental" policy practices.

Central to exploring ICT's "developmental" aspects is a widespread inclination to relate ICT diffusion to economic output. This is normally conducted by identifying correlations between some preferred ICT diffusion indicator or index for a given country and this country's GDP per capita, and conducting regression analysis of such data for the whole world.[55] The result of the regression analysis is always a positive correlation between ICT diffusion and GDP, where ICT diffusion grows rapidly at the beginning with increased GDP per capita, showing that increased GDP is correlated with increased ICT diffusion. The curve then levels off at some point, demonstrating that at this point further increases in GDP do not produce proportional increases in ICT diffusion, if any. For example, in the case of NRI, increases in GDP per capita are correlated with increases in NRI, where GDP increases have high impact on increasing NRI rapidly at low GDP per capita, but this ability decreases as GDP per capita increases. The report estimates that around a GDP per capita of USD $6,000 to $9,000 the "the effect of increasing GDP [on increasing NRI] becomes much less pronounced. Other factors become more relevant to the NRI score at higher values of GDP per capita."[56]

However, even though the empirical data essentially depict a partial correlation between GDP and ICT diffusion, ICT reports frequently portray the correlation as a general causality that holds in all cases. In doing so, they usually employ reversed logic by arguing that increasing ICT diffusion increases GDP per capita. Some even go so far

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[51] For international projects which echo these assumptions, see for example the ICT for development platform that is promoted by World Summit on the Information Society (WSIS), available on http://www.ict-4d.org . For the Palestinian case see UNDP (2003), *Programme of Assistance to the Palastenian People: Information and Communication Technology, United Nations Development Programme*, available on: http://192.115.229.1/sustainable/ict.htm

[52] *Global Information Technology Report 2003-2004: Readiness for the Networked World*, World Economic Forum: www.weforum.org, p 4.

[53] Ibid, 18.

[54] Studies on ICT in the Arab world are not different. See, for example, the development emphasis of ICT in UNDP (2002), *The Arab Human Development Report*. Similarly, in one of its presentations Platrade stated that ICT can be the economic pillar for the state of Palestine. That is, the emphasis of the developmental role of ICT diffusion is clearly manifested on the international, regional, and Palestinian levels.

[55] Orbicom, World Bank, and NRI are examples of those who relate ICT diffusion rates per capita and GDP per capita.

[56] *Global Information Technology Report*, p 12; fig.3.

as to identify exactly how much a country's GDP would increase if that country increased its ICT diffusion by one point on the index adopted by the report. The Orbicom report, for example, calculates that if a given country would increase its ICT diffusion by one point on its ICT index (*infostate*) the country's GDP per capita would increase by approximately USD $124-164.[57] Other reports do not necessarily mention the causality as explicitly as Orbicom, but spend time analyzing the correlation in a manner that implies this causality. The conclusion that the readers are left with is that increasing ICT diffusion increases a country's wealth. The reverse interpretation of the correlation, that wealthy countries have the ability to attain high ICT diffusion, is much less emphasized.

This causality—higher ICT penetration equals higher GDP per capita—is widely adopted, and as a result many developing countries devote their limited resources for developing their ICT sectors to benefit from opportunities of the "new economy". However, any simple analysis would find the direct causality not always defendable. ICT grew all over the world during the recent international economic recession, and in fact, despite it. Reasons why increased ICT diffusion did not help its economies overcome the recession, and in fact stagnation in Europe, are not discussed by ICT assessment reports which assume this linear causality, although such relationships form an integral part of studies related to ICT economy (in academic publications outside assessments of ICT diffusion). If anything, the last few years clearly demonstrate that increased ICT diffusion did not necessarily produce comparable increases in economic output in many countries. The situation in the Arab region endorses this. In Egypt, for example, ICT's diffusion almost doubled in the same three years that witnessed a severe economic downturn, while in Palestine they increased tremendously between 1999 and 2004, which was also the period that witnessed an almost total economic collapse and upsurge in poverty. In short, to claim that more ICT means more economic output is not necessarily valid in all cases, yet it is the basis for adopting, or at least justifying, ICT development investments in many countries.

ICT's ability to improve the efficiency of businesses is another developmental/economic impact of ICT deployment that is quite often cited. The latest WEF's report on NRI identifies two ways by which businesses benefit from ICTs.[58] According to the report, businesses used ICT in the past primarily to change their business models. Although the report does not dwell on the ways by which this has been undertaken, some are obvious. Large businesses used ICT to integrate multiple organizational and operational units all over the world, merge with other firms, outsource previously internal businesses processes, automate and integrate their supply chains, change their relationships with their clients by using web ordering for example, and the like.

In any case, the effects that ICT diffusion has on productivity, growth, and generating employment opportunities remain highly debated issues. At this time, we don't know under which circumstances ICT diffusion promotes employment as opposed to when its net macro effect is to replace already existing jobs. These issues remain contested even now, where the different sides of the debate furnish empirical data to support somewhat conflicting positions: ICT enhances productivity versus ICT does not

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[57] Orbicom, p87.

[58] NRI is used here as short for the *Global Information Technology Report.*

really enhance productivity; ICT promotes unemployment versus ICT creates new employment opportunities.[59] "Thus, while computer terminals are everywhere, it is not always clear whether they are displacing workers or adding additional services and employment."[60]

The widely assumed "developmental" potential of ICT diffusion is therefore not to be taken for granted. It has to be analyzed against the economic realities of the country under study, and the type of ICTs and their diffusion. In the case of Palestine, these economic realities are very harsh. The Palestinian economy is almost collapsed. Lack of sovereignty and PA corruption are the main factors which shape the Palestinian economy, not "free market dynamics." The economy in Palestine can be pictured as a group of economic arrangements controlled by Israel and confined within specific set of economic activities that are mostly beneficial to people who are well connected with the PA. The Palestinian economy is fully dominated by Israel; the PA does not even have an independent currency. As a result, economic transactions in Palestine are conducted partially in hard currencies, but mainly in Israeli currency, even though the Jordanian dinar is the currency used officially. Both of these are hard currencies from the PA's standpoint. This narrows down areas of maneuverability for the PA and confines its monetary policy to no-policy. The PA cannot really perform the most basic economic functions: manage money supply, issue treasury bonds, print money, etc.

Israel also controls all aspects of imports and exports, allowing goods to pass to the territories when it wants, and closing the borders as it pleases. It also collects many taxes that should normally be collected by the PA, and delivers these taxes to the PA after collection. In so doing, Israel quite often freezes payments of PA money for long periods, usually citing security concerns. This puts the Palestinian budget under many pressures, and has quite often meant limiting the Palestinian budget to the extent that the government is unable to pay the salaries of its own employees. Simply put, the budget of the Palestinian government is a mess. It was kept floating by external aid, which started to erode ever since financing Palestinian institutions became tantamount to acts of terrorism and Arafat became a man not to be dealt with in US-Israeli forced international rhetoric. The Palestinian balance of payments (BoP) reflects this situation well.[61] It shows that governmental inflows from foreign sources have always played an important role in balancing "national" accounts. Currently, the main factor that is keeping the PA partially floating has been EU money, which is one of the rare sources of government finance that hasn't fled the country. Corruption, which is rampant in the PA, further exacerbates this situation. Recently, the PA's financial authorities have announced that $400 million of the government's revenues—a considerable sum in the case of Palestine—cannot be accounted for.

The standard of living in Palestine has deteriorated recently and reached an alarming level. In the past four years the Palestinian economy depressed to its size in the late 1980s. One can safely assume that the territories moved from a low middle-income

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[59] To explore the different arguments, see Smith, 2001; Shedl, 1997; Soete and ter Wheel, 2002. See also *Network for Capacity Building and Knowledge Exchange in ICT Policy*, Regulation and application, available at <http://cbdd.wsu.edu>

[60] *World Employment Report (2001)*, International Labour Organization (ILO), available at http://www.ilo.org/public/english/employment/strat/wer2004.htm

[61] BoP and GDP data are taken from PCBS economic reports, available at www.pcbs.org.

country to one classified among low-income countries by the end of 2004. As put by PA official reports,

> Disturbing figures were reported in recent poverty reports. The proportion of the Palestinian poor has almost tripled (living on less than $2 a day); unemployment has also tripled to affect a third of the total workforce. Real income has dropped by 30%, reaching a level lower than that of the late eighties. Over 60% of the population lives below the poverty line, double that reported in the year 2000.[62]

The picture drawn above requires that policy makers become very cautious when strategizing for using ICT for economic development. Uncritically adopting the idea that ICT diffusion would lead to economic development and prosperity would most certainly lead to many disappointments, at the very least. Some of the current policy views seem to point to this: to capitalize on ICT to get to the regional market, which requires putting in place policies that would enable this.[63] E-commerce is also a heroic component in the background driving such viewpoints, even though the percentage of internet users who use the net for e-commerce purposes is almost zero despite the fact that internet use in Palestine is relatively high.[64] It simply has not taken off; the structural factors mentioned above impede its development. Because the territories cannot be economically sovereign or even slightly economically independent, many argue that the regional market can be the one to target; ICT can in fact provide opportunities where Palestine, as fragmented as it is, could become an economic player of some sort. After all, ICT activities do not need much of a home base if only proper policies were put in place.[65] In this context, attacking PA policies—or lack thereof—is almost a common component of most literature on ICT diffusion in Palestine.

Problems with such views, and their unrealistic bases, are very easy to point out. As recent studies show, the current ICT skill level in Palestine is quite modest. Palestinian ICT companies are still mostly in the retail phase; they are retailers for Israeli and some international companies and very few of them are beyond this level.[66] Moreover, the software industry in Palestine is marginal.[67] Therefore, even though it is conceivable that some Palestinian companies can compete in the regional market, their number and size of operations would most certainly be quite modest. The regional market has by now accumulated some sophisticated experience that the Palestinian ICT sector can't match easily; it is one step ahead. It will therefore require some time before Palestinian ICT companies can have sizable regional operations. Furthermore, the local market (in Palestine) does not display signs of high demand for e-commerce, a matter that would probably remain valid on at least the medium term. Thus, ICT export and

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[62] Palestinian Ministry of Telecommunication and Information Technology (2003),*Palestine Paper for the World Summit on the Information Technology*, also see World Bank country data for Palestine which portrays a similar situation on www.wb.org.

[63] An Arabic white paper by the influential Palestine Trade Center PALTRADE (n.d.) identifies exports to the region as the way to go.

[64] PCBS survey for 2004.

[65] PALTRADE presentation (n.d.), *National Trade Dialogue Project.*

[66] See Sartawi, Badie (2003), *Profile of the Information society in the Palestinian authority*, United Nations Economic and Social Commission for Western Asia (ESCWA).

[67] See Makhool, Basim and Nasr Atyani (2002), *Software Industry in the West Bank and Gaza Strip*, Jerusalem and Ramallah: Palestine Economic Policy Research Institute. Their study shows that software development in Palestine is indeed marginal.

commerce enhancements in Palestine are improbable in the short to medium term. Much homework in other more basic economic activities need to be made first. Even if somewhat "favorable" political arrangements can be made with Israel, the current economic situation is capable of trapping Palestine in a dependency relationship with Israel on the medium range. It will require some very serious changes for Palestine to evade it, most of which cannot be classified as technical issues. Accordingly, if e-commerce does indeed pervade such an environment, it could only signal the emergence of a new tighter mode of technology-driven dependency on Israel and the formation of an associated dependant class, which would benefit from middle ground arrangements and marketing ideas about ICT for development.

The experience of India can serve to illustrate this point further. India represents a case often cited in the literature on "ICT for development" as a country that has successfully capitalized on the development opportunities furnished by ICT diffusion. This is based on the fact that India's exports of software products have reached high levels and on that several international IT companies have opened research and development venues in India. But looking closer at the Indian case reveals further important factors.[68] The case of India demonstrates that adopting this strategy often leads to basing the local ICT launch pad in centralized urban centers—in the case of India Bangalore and Mumbai. This centralization promotes socioeconomic inequity. In the case of Palestine, Ramallah can perhaps play this double role of centralization and perpetuating the inequity that comes with it. However, what is more important is that the Indian experience also shows that ICT development offers opportunities for social mobility only for the middle or upper middle class (as they come to work in ICT companies or initiate ICT projects), and specifically to those who were educated in prestigious academies and have strong command of English. It also offers good opportunities for the upper class to further their privileges and economic gains (by owning ICT projects). However, it does not have much to offer to the lower class in terms of economic gains and class mobility. Extrapolating this onto the Palestinian case would result in a rather alarming conclusion. Given Palestine's dependency on Israel, the divides between Ramallal-Jerusalem and the rest of Palestine, the presence of many who are willing to cooperate with Israel, even if this means informing Israeli security about resistance activities, the corruption within the PA, and that Israel is very ICT advanced, a decentralized ICT for development policy would bring only further trouble to Palestine. Middle class and upper middle class in Ramallah-Jerusalem will probably benefit from selling their expertise and cultural capital in the ICT market, PA officials and their relations will benefit from these projects as well, but these segments (PA officials and the upper middle class) would probably become highly dependant on Israel in many new and sophisticated ways. They would therefore come to oppose the aspirations of the great majority of Palestinians because their very interests would be intertwined with the occupier, simply because they are not given other outlets. This possibility stands a good chance to occur. The PA therefore needs to monitor ICT developments with such possibility in mind and to develop the monitoring devices that are needed to undertake this task.

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[68] The following account of India is based on Lakha, Salim (2003), "Cyber Gurus and Social Mobility in India's 'Silicon Valley,'" in Heidi Dahles and Otto van den Muijenberg, *Capital and Knowledge in Asia*: Changing Power Relations, London and New York: RoutledgeCurzon.

There is an optimistic side to this otherwise gloomy story. Unlike other developing countries, Palestine has no need to fear that ICT diffusion can replace labor at a much higher rate than it creates employment (the fear in Egypt, for example). Moreover, the local ICT sector in Palestine is highly underdeveloped and can absorb much more investment and employment, and lead to some economic output. This paper argues that the best ICT development strategy would be to relax the e-commerce that international literature likes to emphasize, relax the regional emphases that ICT development might lead to, and focus instead on the local ICT development realties. Because the ICT sector is now very small, local growth has the potential to sustain a reasonable ICT sector. And because ICTs are very important in Palestine for social, geographic, and demographic reasons—more important, in fact, than economic reasons—there is room for local ICT growth to fill such crucial needs. However, to do this would mandate that the PA would be able to exert more sovereignty over its territories and the ability to defend its ICT space and markets. It would also require that the PA give up this notion of a holistic ICT sector and devote attention to the impacts of the diffusion of different ICTs separately. The best way to do it is to get rid of the term "ICT" itself and focus on different technologies, different services, and different users, which is not, incidentally, very far from what PCBS does in reality.

ICT Policy

Most indicator systems have an overemphasized ICT policy/regulation focus. Not only have all of them developed many indicators and indeces to measure various policy aspects, but some go further and regard ICT policy and governments' actions as central determinants of ICT diffusion. Some even regard it as the most important determinant. NRI makes unequivocal statements in this direction, "Overperforming countries have put ICT on the national agenda, and have striven to make it an area of excellence, whereas other underperforming nations have not done so."[69] Although such a statement is evidently erroneous, for it ignores many important factors that influence ICT diffusion, and simplistically assumes that over-performance can be attained as a result of governments' efforts without accounting for other important factors, it nonetheless represents common beliefs among ICT technocrats.[70] MOSAIC group provides a prime example for those who explicitly adopt such an overemphasized conceptual policy focus. In their conceptual framework, the group states that ICT policy is the vantage point from which all other ICT attributes flow.[71] Moreover, in the schematic diagram that explains their framework, policy is treated as the dominant variable that shapes everything else. MOSAIC, however, does not honor this conceptual commitment in application, for they do not provide more indicators to measure policy effects or force policy issues on non-policy indicators than other systems do. NRI represents the opposite of this inclination. It does not have an extra strong policy focus on the conceptual level, but overemphasizes policy effects in application, in their conclusions, and in the indicators that they promote. Alternatively, the ITU Digital Access Index (DAI) is probably the only ICT index that

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[69] *Global Information Technology Report.*

[70] This is clear in Palestinian policy papers that blame poor ICT developments on government policies. See e.g. Bahour, Sam (2001), *Palestinian Private Sector Information Technology Policy study: final report*, Ramallah: PALTRADE.

[71] See http://mosaic.unomaha.edu/Pages/mosaicgroup.html.

does not address ICT policy, and in fact deliberately so. The index correctly regards policy evaluation as an issue that cannot be easily captured by objective statistical indicators, and thus refrains from addressing it.

ICT policy indicators typically measure qualities related to the presence of independent ICT regulatory bodies, freedom and transparency of ICT regulations, the level of competition allowed by regulations in the ICT market, the degrees by which foreigners are allowed to own ICT projects in a given country, quality of the legal system, efficiency of the tax system, and so on. Different systems focus on different indicators derived from free market ideologies. They measure free market policy attributes with the assumption that fulfilling such market "favorable" regulatory conditions would maximize ICT diffusion and its benefits. Adopting such a policy focus drives ICT reports to examine correlations between the policy factors measured and ICT attainments. NRI provides ample examples for this tendency. On the issue of adopting policies that allow open competition, for example, it concludes that the cost of ICT services decreases with increasing competition, and therefore it becomes more affordable.[72] The report concludes, "[c]ompetition in the ICT sector makes services more affordable, and the more affordable a service becomes, the more it is used by the key stakeholders—individuals, businesses, and governments."[73] However, in a country like Egypt, a different trend has been observed. Internet diffusion remained low until the government subsidized internet charges and made it affordable to more people. Only when the government forced the public sector telecom operator to split revenues from phone charges with private sector ISPs, and forced ISPs to fix their prices at much lower levels and be content with their share of telecom charges did the diffusion start to increase.

Granting that ICT diffusion probably correlates with adopting free market policies, there is neither evidence to support that this correlation is indicative of causality, nor that government subsidies to promote demand will harm diffusion. ICT diffused most in wealthy countries, which were already adopting such "favorable" policies before ICT achieved prominence, and independent of it. It could be that the wealth of these countries lies behind why ICT diffused so rapidly and widely. Alternatively, the reason why their ICT diffusion was rapid might lie elsewhere, in their human capital levels and the long cumulative historical process of human resources development. Their advanced international trade may even be a reason. In other words, the correlation between high ICT diffusion rates and open market policies does not have to indicate causality; it is not necessarily true that the best way by which low-income countries would increase their ICT diffusion is to adopt these "favorable" ICT policies. It could be so, but maybe not. After all, they differ markedly from ICT advanced countries in their trade, human development, and—above all—wealth. The centrality of free market policies in the causality would be true if the experiences of low-income countries agree with it, which is yet to be validated. Uncritically adopting this assumption could therefore actually serve to hide other important causes of rapid ICT diffusion. It could also undermine our understanding of how policies evolve and what factors influence them. For example, to allow foreigners to own and operate ICT projects in a certain country is a complex issue that transcends ICT into the realm of the development philosophy that this country adopts,

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[72] *Global Information Technology Report*, p 12; figs.4 & 5.

[73] *Global Information Technology* Report, p 16; fig 7.

a matter which is presented in ICT reports as a technical issue. There is also no evidence to support that undertaking this would be "favorable".[74] It remains a supply side policy parameter that has little to offer for enhancing situations where demand is very low.

The previous argument seeks only to cast doubt on the certainty of whether adopting such "favorable" policies would result in increased ICT diffusion, and whether indeed ICT diffusion under these policies would be the most beneficial. Recent experience in Palestine testifies to another rather conclusive shortcoming of these assumptions. ICT diffusion can grow without undertaking the proposed policy measures. So testifies the Palestinian experience. ICTs diffused rapidly in Palestine in the past four years under probably one of the worst policy conditions possible.[75] Diffusion was demand-driven when supply side policies were lacking. In fact, the PA did not really have an ICT policy.[76] The reasons for this could be partially attributed to PA mismanagement, bad policies, corruption, monopoly, and favoritism, but ultimately are due to external factors imposed by Israeli occupation and militarization. During the last four years, Israel destroyed the PA's ability to exercise its administrative authority. The result of this has been the prevalence of the most unfavorable policy environments by any definition, or maybe even a no-policy situation. In fact, the current Palestinian policy/regulatory environment is the best example of everything contrary to what ICT indicators promote and propose to monitor. Yet this has not stopped ICT from diffusing relatively rapidly even under such "unfavorable" policy conditions; indeed diffusion has been much greater than in many developing countries which try to adopt "favorable" policies. Similarly, internet use increased most in Egypt under government subsidy.

On the practical level, another form of unsuitability emerges. Assume that when applying these indicators and adopting all the best practices promoted by IOs, the PA would then score very well in this respect on the indicators list. There is still no reason to believe that this would significantly influence ICT in Palestine. For example, there is no reason to believe that restricting PALTEL's control over the telecom market, a frequently cited policy problem in Palestine, would be able by itself to improve internet diffusion within the set of factors perpetuated by Israeli occupation. Forces of occupation and other local realities are much more influential and capable of neutralizing all PA efforts and the effects of "good policies." If one applies these indicators on their own to measure policy attributes of ICT diffusion in Palestine, the result would not be very relevant. These indicators therefore make unsupported stereotypical assumptions about how diffusion relates to policy, and are particularly irrelevant to Palestine.

This is not to propose that monitoring the policy aspect of ICT diffusion is useless, or to argue that monopoly is good, as much as to draw attention to the need for modifying the outlook of such indicators when applying them to countries like Palestine. Because local realties are unconventional, policy-making in Palestine would also benefit from a

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[74] For example, Malaysia learned the hard way that development which is based on attracting free floating foreign capital can be very costly, even though this was the most "favorable" policy alternative at that time. In fact, it was the financial model to adopt, and thus all the tiger economies adopted it. Since the "Asian crisis," Malaysia adopted a "restrictive" policy which chooses what type of foreign capital to depend on: mostly long to medium term non-speculative capital. Many counter free capital movement initiatives were promoted since the Asian crisis indicating the fall of the previously dominant favorable policy assumptions.

[75] For a review of the PA's ICT policies see Sartawi (2003); Bahour (2001).

[76] Ibid.

strong local focus. Statistics provided by PCBS suggest that the PA would do well if it tried to promote policies that would enhance the spread of internet cafes to target important bottlenecks and provide important services. Other policies that would promote ways by which owners of access devices who do not use the internet come to actually use it might be very useful as well. Moreover, strategies and policies that target diffusion inequity across gender, class, educational background, and age, would be targeting very important and strategic issues, even if they need to adopt counter market perspectives. In short, uncritically adopting supply side policies or rejecting subsidy to enhance demand might by problematic initial assumptions to base ICT policymaking on in a country like Palestine. Finally, the previous discussion points to the need to dig deep into the real effects of ICT policies on diffusion without resorting to unsupported assumptions that might fit some countries but not others, as well as not to always attribute the reasons behind high diffusion to policy elements when other factors are clearly in play. Undertaking this would necessitate integrating the very powerful and significant impacts of Israeli occupation into a regulatory/policy environment when conducting the analysis, which would not be possible by solely adopting standard policy indicators and their focus on PA policies.

Methodologies

Whereas most of the well-established institutions that promote ICT indicators agree on a very basic level that they should seek "universality" of ICT measurement indicators, and that ICT diffusion should be supported for developmental and economic growth reasons, they resort to slightly different methodologies for achieving these common objectives.

Current ICT indicator systems tend to divide the overall ICT sector into a number of main subdivisions or areas—such as users' readiness to use ICT in a given country (e.g., NRI), sophistication of ICT use in a given country (e.g., MOSAIC), infrastructure (e.g., World Bank), affordability (e.g., ITU), etc. These areas represent the main divisions of an ICT sector in a given country, as seen by the indicator system under analysis, which different systems tend to divide differently. Indicator systems usually divide these main areas or divisions further into subdivisions or sub-areas on a lower level, which are further divided into more subdivisions on a following level, and so on, until they finally reach single measurable indicators which are not composed of other indicators. The ICT sector is thus divided into several upper level indicators, which are composed of families of composite indicators, which are in turn themselves composed of clans of further indicators.

In this respect, different indicator systems differ in an important way. On the one hand, some of them integrate all these families into one index at the highest level, which naturally means that this highest-level index serves as an indicator of the overall ICT sector in a given country. Examples of systems that belong to this trend include WEF's NRI, World Bank's Knowledge Index, ITU's Digital Access Index, and Orbicom's *infostate* index. On the other hand, other systems, such as those adopted by Harvard University or MOSAIC, do not integrate all of the main ICT subdivisions into one index. Instead, they provide separate assessments of each of the upper level divisions of an ICT sector of a given country. An ICT sector of a given country, defined in this paper as the extent to which ICT penetrates the economy, would thus be described by using several main indicators, not by one index. Table 7 illustrates the number of levels into which each of the selected indicator systems divides an ICT sector. It also points out which of them utilize an overall index and which do not.

Table 7: Main subdivisions of the ICT sector for each indicator system

Indicator System	Overall Index	Indicator system's divisions
Harvard	No overall Index	5 main composite indicators composed of 19 different indicators; no overall index.
ITU	Digital Access Index	One overall index divided into 5 composite indicators composed of 8 different indicators.
ITU standalone indicators	Standalone	ITU adopts as well a group of standalone indicators that are used in different ways; sometimes some of these indicators are grouped together, but only in listing them, not to imply mathematical combinations.
MOSAIC group	No overall Index	6 main indicator areas; in connection with 12 independent determinants.
Orbicom	Infostate	One overall index divided into 2 main composite indicators (supply and demand), which are composed of 4 further composite sub-indicators that measure 20 single indicators.
Knowledge Economy, World Bank	No overall Index	5 main composite indicators composed of 14 different indicators; no overall index.
ICT Infrastructure indicators, World Bank	No overall Index	The WB uses as well 13 ICT infrastructure indicators that are used as part of other composite indicators.
World Economic Forum (WEF)	Networked Readiness Index	One overall index divided into 3 main composite indicators, which are composed 9 further composite sub-indicators that measure 48 single indicators.

The different conceptual categorizations listed in Table 7 pose a basic question: Are there better ways to divide an ICT sector? There seem to be two main ways by which an assessment system divides an ICT sector, one of which appears to be rather an invalid claim. The first, which is used by most systems, divides an ICT sector "logically" and proceeds to develop indicators that would measure each division, be they single indicators or composite ones. When analyzing such systems the critical issue would therefore be to examine the logic upon which they have divided the ICT sector and the ways by which they attribute values to each division. The second methodology, which appears to be used only in developing NRI, adopts an opposite technique. It claims to have collected a group of single and isolated ICT variables first, then worked out the relationship between them, and finally to have grouped them into clans and families and so on, based on the relationships identified. In application, however, it appears that this methodology claims false empiricism, as the case of NRI demonstrates. The NRI ends up reaching divisions that group seemingly unrelated variables together. These unrelated variables end up composing groups of "logical" ICT divisions, implying that those who developed the index have probably fit variables into pre-existing "logical" divisions, not by identifying divisions from analyzing the relationships between standalone variables. It is therefore safe to assume that in practice all of the indicator systems available follow the first methodology, even when they claim otherwise. That is, they divide an ICT sector into divisions by logical inference and allocate values to these logically induced categories. No doubt the development of indicators is informed by certain conceptual formulations. It is not clear how these formulations meet the specific needs of a third world region such as Palestine.

These methodological inclinations ignore very important factors that would be crucial for proper policy making in a country like Palestine. Previous sections argued that the "logic" of these systems is simply derived from addressing the needs and past experiences of ICT-advanced countries. This has led the designers of these systems to focus on static indicators—indicators which try to give a snapshot of what is going on. They all agree on this, even as they disagree on the specific type of static indicators that should be used. Longitudinal analysis can then be conducted by capturing the values of the recommended static indicators overtime. However, adopting this view ignores process-oriented phenomena, which would require using more dynamic indicators. The most important processes for a country like Palestine that all these indicators would normally ignore by virtue of their static focus are (1) technology enablement and (2) technology rejection. Static statistics that are compiled by PCBS show that a large portion of households which have computers and telephones at home do not use the internet, as described above. The reverse is also true. A large portion of users are in fact "users against all odds": they are of low income, have little education, and don't own hardware; yet they overcame all these barriers to become internet users. Factors which make technologically endowed people refrain from becoming users, and those which enable technologically and socioeconomically deprived people to become users, are not addressed within the frameworks described above. They require more process-oriented indicators and more attention to be warranted to the users' experiences and preferences than the current system would allow with their static market focus.

Having a static focus is not the only problem with these methodologies. They are also confusing with regard to how they attribute values to the qualities being measured. In attributing values to each indicator, different systems again use different methodologies. On the one hand, some systems (such as MOSAIC and Harvard) assess a certain ICT aspect according to which stage of ICT progress it lies in; MOSAIC uses five stages while Harvard uses four. Each stage—for every ICT dimension to be measured—is well qualified to reduce the possibility that two different researchers would place a certain ICT attribute of a given country in different stages.[77] This stages system faces at least two problems. First, it is sometimes difficult to place a community in one of the stages because none of the adopted stages describes it well, either because the country's performance lies between stages, or because some parts of the country lie in a high stage (e.g., capital cities in developing countries) where other parts lies in a very low one. Second, and more importantly, this system lends itself well to becoming obsessive with ranking and missing out on important local features that are not part of what is being ranked on the international scale. Accordingly, stage-scoring systems are not recommended here. However, that is not to say that the ICT areas addressed by these

[77] Harvard's system provides more extensive qualification for each stage of progress for every given ICT dimension being measured.

indicator systems or the various elements included in the stages should be ignored. The problem is mostly in the ways by which these systems attribute values to their indicators, not in what they address.

The other system attributes numerical scores to a given indicator. It is usually more "objective" and thus different analysts should be able to attribute the same value for the same indicator independently from each other. The numerical score is usually computed as a comparative relation between a country performance and a maximum *target* (DAI), or the highest score attained so far for the dimension under study (infostate, NRI, KEI). It is also often normalized on a common score—1-7 for NRI and 1-10 for KEI, for example. In some cases, however, the indicator is expressed in a simple non-comparative percentage format, such as ITU's standalone indicators. In working out the value of composite indicators, some of the systems that use a normalized scale compute the simple average of the indicators that compose the larger composite indicator or index, while others assign different relative weights to emphasize some attributes over others. Even those that do not explicitly assign relative weights implicitly do so in practice because different composite indicators are composed of a different number of variables or single indicators; therefore each variable contributes a relatively different weight to higher indicator groups, depending on how many other variables were grouped together when averaged.

No one methodology of the ones mentioned is best suited for Palestine. Instead it would be much better to borrow aspects of each of the different variants that are deemed most suitable for the Palestinian case, on a case-by-case basis. The list below suggests some ways by which this can be achieved:

- First, overall indeces can be very misleading and are not useful. Having an overall ICT index confines the understanding of a complex issue such as ICT diffusion into one simplistic number. It is therefore not conducive to policy formulation and is only suitable for preparing problematical country ranking lists.
- Second, all of the methodologies above tend to divide an ICT sector into components and divisions, which is a useful way to relate indicators to each other in a logical way.
- Third, ICT divisions are better limited to one level of clustered indicators. Dividing an ICT sector into more than one level of composite indicators can confuse the analysis when, for example, researchers disagree about the placement of a specific variable in the lower levels of a tree of composite or nested indicators. It also confines the relationships between the various sub-indicators into narrow interpretations, thus restricting their flexibility and hiding their truly complex nature.
- Fourth, many problems can arise from relating ICT indicators to each other by resorting to standard weighted averages, or even simple averages. Doing so requires conclusive knowledge about the relationships between the various indicators in a given group, which are not possible to obtain. For example, if one chooses to monitor quality of use as being composed of use regularity, average session duration, and user experience, ascribing exact weights for each would be problematical and perhaps random. Ascribing relative weights also conveys a standard understanding of the relationships among the various components of an

ICT sector that this paper views to have been an important shortcoming of the currently available systems.

- Fifth, assessing ICT diffusion by placing it into a stage of progress or levels is only useful to compare ICT diffusion in Palestine to its counterpart in other countries, and thus identify important differences. It is, however, not possible to use this methodology to address internal changes with suitable levels of detail, and thus should be supplemented with other analyses.
- Sixth, the experience of the users and their preferences need to be addressed by indicators which do not suffice with focusing on market, businesses, and policy related parameters.
- Finally, process-oriented indicators need to be used to monitor crucial processes that are related to technology enablement.

Table 8 lists the first level divisions into which each system divides an ICT sector. Each of the divisions that are used by composite non-standalone indicators is judged here to indeed represent important ICT aspects. In addition, they seem to collectively complement each other. The problem with these divisions, however, lies on a lower level. Disagreement between these different systems is not only observable in how they divide an ICT sector, but in how they chose variables that supposedly account for each division. This problem can be avoided by critically examining how each of these ICT qualities is evaluated in a given system on a case-by-case basis.

Table 8: First Level Divisions

Indicator System	**First level divisions**	
Harvard	Access Learning Society	Economy Policy
DAI, ITU	Infrastructure Knowledge Affordability	Quality Use
ITU standalone indicators	Fixed Telephone Net Cellular Net Internet ISDN rates Quality of Service	Traffic Tariffs Staff Revenue & investment
MOSAIC indexes	Pervasiveness Geographic dispersion Sectoral Absorption	Connectivity Infrastructure Organizational infrastructure Sophistication of Use
Infostate, Orbicom	Info-density (supply)	Info-use (demand)
KE, WB	*Economic Incentive &* institutional Regime Education Innovation	*Economic & social performance* ICT
ICT	Telephones/1,000 people	Investment in telecom as % of GDP

Infrastructure indicators, WB	Main phones/1,000 people Mobile phones/1,000 people Computers/1,000 people TV sets/1,000 people Radios/1,000 people Daily newspapers/1,000 people	Internet hosts/1,000 people Internet users/1,000 people Cost of call to US in $ per 3 minutes E-government ICT Expenditures as a % of GDP
NRI, WEF	Environment Readiness	Usage

— Part III —

Concluding Remarks

This paper presented a critical analysis of some of the widely used ICT diffusion assessment systems and evaluated their suitability to assess diffusion in Palestine. The analysis indicates that these standard systems feature important systemic shortcomings, which cannot be easily ignored or worked around. These shortcomings render the assessment systems only partially suitable for the task, at best. To use any of them on its own for analyzing ICT diffusion in Palestine would require adapting and modifying it so extensively as to change them from what they were designed to be. By trying to be universal in stereotypical ways, they all fail to address important aspects of Palestinian specificity properly. Given that aspects of specificity are extremely important in many countries, and in Palestine in particular, that they do not address it properly becomes a serious omission and a significant deficiency. One of the most basic unfounded assumptions upon which ICT indicators are based, and in fact the main reason they were invented and promoted in the first place, is that ICT diffusion results in economic growth regardless of local realities. Generalizing this to all countries is an unfounded assumption that generally governs and restricts ICT development rhetoric. It results in promoting supply side policies which favor the interests of ICT brokers while neglecting those of demand. These systems are therefore most suitable for compiling international data and aggregating them so that we can formulate understandings of ICT diffusion all over the world. They are not suitable for guiding policies on a the local level because they don't address many very important issues.

In the case of Palestine, ICT assessment systems are found to be especially deficient in their neglect of users and their treatment of ICTs as if they were one holistic entity. This is mainly caused by their supply side focus. As a result, they exaggerate the interests of the ICT brokers and ignore those of the most important stakeholders in country like Palestine: the users. ICT plays a very important role in Palestine, which is mostly centered on enabling the users to overcome very harsh geographic, social and political barriers, less so for economic gains. Moreover, in very basic terms, the developmental role of ICT that these indicators suppose simply does not exist. It is possible to talk about different ICTs and their different developmental roles, but not about a developmental role for ICT as a holistic entity. The internet and satellite TV are the ICTs with the highest potential to serve the Palestinian people, because they enable needed communication between the various parts of the territories, between the territories and the outside world and the Palestinians of the diaspora. Internet and satellite TV are important also in that they keep the people inside the territories in contact with world knowledge, and they provide Palestinians with the space needed for them to present their struggle to the outside. They can overcome barriers of occupation in some way. However, they have not been able to create a forward-looking economic sector that can be used as a launch pad for regional activity. The current economic data show that this would be unlikely in the near future.

Because of these deficiencies, which most of the standard ICT assessment systems tend to share, not one of them tries to assess what people use ICTs for, what benefits they reap from them or how they view them, the skills they develop, the ways they access them, or how all of this is distributed in society. Moreover, they can't tell us what makes people who are technologically endowed refuse to become users, or why those who face very challenging socioeconomic factors and educational barriers manage to cross them and become technologically enabled. Unfortunately, since these are by far the most important aspects of ICT diffusion in Palestine, systems which ignore them are simply not useful.

This paper tried as well to argue that the problems mentioned above do not result from misapplying the indicators as much as that they are part and parcel of the very logic that produced them. ICT indicators are based on the experience of ICT advanced countries with the assumption that if ICT underdeveloped countries would imitate the characteristics that are identified by the indicator systems as favorable they would become ICT advanced. This is a very simple but not necessarily correct assumption which reduces the speed of diffusion to administrative policies and to acts of creating favorable market environments, and it ignores other very important factors.

In reaching these conclusions this paper made extensive use of the statistics provided by PCBS. The statistical concepts that PCBS uses were found to be superior to those of the other systems and much more adapted to the realities of Palestine from a policymaking perspective. This paper recommends that analyses of ICT diffusion in Palestine would stand to gain much if they build on PCBS statistical concepts more than those promoted by international systems. Additions and modifications to PCBS, as well as more cross tabulations that are not restricted by international assessments would be quite helpful. The paper pointed out areas where improvements can be made and where PCBS data point to important and valuable qualities.

Finally, in judging between the different systems available, this paper judged them based on their impact on policy-formulation. The way by which we evaluate the suitability of assessment systems that were discussed here will surely depend on their intended function. Can they perform this function? This is the central question of this paper. Therefore the main criteria that were adopted here for evaluating them centered on the type of policies that would be recommended from applying these systems. Can these assessment systems describe ICT diffusion in Palestine in ways that would promote sound policies? The answer given above was that they couldn't. The story that they enable is very partial as the statistics provided by PCBS show well. Standard assessment systems are designed in such a way that they only capture very general features of the diffusion. They are also based on assumptions that are not always valid in a Palestinian context. They were thus continually incapable of providing a satisfactory picture of the diffusion in Palestine. This has been tested on thematic grounds where "access" and "use" indicators as they are now were, for example, found to be the least useful and good "distribution" indicators were almost non-existent. Finally, some of the indicators that these assessment systems use were found useful and applicable to Palestine, especially indicators which address technical quality issues, but they are by far the least crucial for promoting the diffusion of various ICTs for the benefit of the Palestinian people, given the conditions that they face.

To assess diffusion in Palestine this paper proposes that any assessment has to put the user at its center— not the market, the brokers, the ability to implement assumed favorable policies, or the interests of the businesses—and move from this point forward. This would require looking at many process-oriented phenomena to complement the static picture that we try to draw with understandings of how things evolve. The following list suggests some such indicator types for the internet moving from the user to the larger framework.

Diffusion of internet:

— number of subscribers;
— percentage of households that have internet available at home;
— users per capita;
— percentage of adult users (ten years or more);
— users per subscription.

The different ICT stories that the indicator helps us draw should be compared and analyzed.

Diffusion of computers:

Same as above except subscription.

Venue of use in percentage of total users:

— home;
— work;
— school or university;
— cafes and other public venues;
— through friends or acquaintances.

For these indicators the one-venue-only values should be monitored separately from the multi-venue ones where users use more than one venue.

Use quality:

— average number of sessions per month and their variance;
— average duration of sessions and their variance;
— average users' internet experiences in months and their variance.

Could be obtained from ISPs' and internet cafes' log databases with some effort in selecting the sample to be monitored.

Purpose of use as a percent of average use time:

— e-mail;
— chatting;

— education;
— accessing news;
— searching for information;
— using government services;
— downloading (music, software, games);
— commerce;
— religious.

If possible to obtain, the variance in the above categories and the distribution of their combinations could be useful as well.

Sophistication of users:

— percentage for email only;
— percentage who know of and know how to use a search engine;
— percentage who know of and know how to use a search engine among post-secondary students;
— percent who use it to download/upload data and services;
— ability to perform simple research tasks and knowledge of browser capabilities: to be determined using qualitative research methods.

ICT in education:

— average actual hands-on logon time per student in post-secondary institutions;
— average ICT related education in course hours per post-secondary student;
— number of post-secondary graduates in ICT disciplines every year;
— quality of ICT education: to be determined using qualitative research methods.

Education in Palestine:

— enrollment (less than secondary; secondary; post-secondarygraduates);
— illiteracy rate.
— Computer illiteracy

Distribution of users and digital divides:

— by age;
— by educational background;
— by profession;
— urban/rural;
— refugee camp/non refugee;
— income;
— gender;
— geographical distribution.

Internet enablement:

— the main factors which lead to users overcoming harsh socioeconomic barriers: to be determined using qualitative research methods;
— main features or stages of the process of enablement mentioned above: to be determined using qualitative research methods.

Internet deterrents:

- — the main factors which lead technologically enabled people to refuse to use the internet: to be determined using qualitative research methods;
- — main deterrents to internet cafes' use among those who lack ownership: cost, perceived low gains, lack of skill, area of dwelling not covered by service.

Support structure:

- — main support structures that help users overcome technical problems that they meet (ISP helps, friends help overcome technical problems, computer maintenance professionals, etc.): to be determined using qualitative research methods.

Infrastructure:

- — main telephone lines per household;
- — internet cafes per capita;
- — computers/1,000 people;
- — computers per internet users;
- — number of ISPs;
- — number of subscribers, users per ISP;
- — TV sets/1,000 people (percentage of those connected to satellite TV).

Ownership saturation:

- — percentage of households that have computer available;
- — percentage of households that have internet available;
- — percentage of households that have computer, internet, and landline available;
- — percentage of households which have computer and landlines available but do not have internet available (main reasons for not having internet);
- — percentage adults who do not use the internet of those who use computers (main reasons for not using it).
- — Percentage of capacity utilization of internet cafes of total capacity in peak hours.

Affordability:

- — total monthly cost of access, ownership depreciation as a percentage of monthly wage;
- — monthly subscription cost;
- — cost of telephone calls;
- — monthly cost of DSL connection;
- — perceived adequacy of internet cost for those who pay subscription.

Economy:

- — value added in IC activities;
- — ICT value added as percent of GDP;
- — ICT exports (main trade partner), also as percentage of total exports;
- — ICT imports (main trade partner), also as percent of total imports.

Websites frequented (to be assessed by using qualitative research methods)

— number and type of content of local websites;
— number and type of content non-Palestinian Arabic websites frequented by Palestinians;
— number and type content of international websites frequented by Palestinians (of which are managed by diaspora Palestinians);
— unavailable web services and information that Palestinians would like to have on the internet.

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Palestinians and ICT: Focus Group Interviews

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Introduction

Interest in researching the Internet and information technology in general has increased substantially in the last two decades. Following the terrorist attacks on 11 September 2001, tracking Internet use has become a major undertaking of Western governments – the USA in particular – in their search for the perpetrators of terrorism. The Middle East garners the lion's share of Internet and web monitoring by foreign governments, and people of Middle Eastern origin who reside outside the Middle East are equally susceptible to surveillance by host governments.

What is not sufficiently acknowledged in the media is that the Internet in the Middle East is increasingly penetrating the home, school, workplace, and even commerce. While there are stark differences in rates of diffusion and ownership of computers among countries in the Middle East, the overall picture attests to a gradual increase in Internet use. The gap between the Middle East and advanced countries, however, remains wide.[1] For example, between 2000 and 2005 Internet usage increased in Syria by 2,566 percent, in Saudi Arabia by 1170 percent, in Yemen by 1,100 percent, in Qatar by 450 percent, in Jordan by 371 percent, and in the West Bank and Gaza by 357 percent. These increases should not obscure the fact that for the Middle East as a whole, Internet penetration rate stands at 8 percent, and 4 percent for the Palestinian territories. The highest penetration rates for Middle Eastern countries are registered by Israel (45%), followed by the United Arab Emirates (36%), Kuwait (23%), and Qatar and Bahrain (each at 21%). This picture is reinforced when examining the rankings along an information and communications technology (ICT) index that is based on adding up the number of installed personal computers (PCs) in the country, the number of Internet users, the number of mobile and fixed line phones, and dividing the result by the country's population. Thus, for 2003, the UAE registered the highest score of 1.50, followed by Bahrain (1.26), and Kuwait (1.17). The Palestinian Territories were located halfway on the list countries of Arab countries in the Middle East and North Africa (MENA) region with an ICT index of 0.40.[2]

Several national surveys in the West Bank and Gaza show that there has been perceptible increase in the use of computers and familiarity with the Internet. Detailed statistical analysis of available data will be carried out in the next chapter. The purpose of this chapter is to provide qualitative data based on focus group interviews carried out in 2004 in the West Bank and Gaza among refugees and non-refugees, and in urban and rural areas.

Sample Description

A total of 124 people were interviewed in 10 focus groups. This was a purposeful sample, designed to explore familiarity of young people with information and communication technology – the Internet in particular. The interviewees were chosen from major Palestinian cities (Bethlehem, East Jerusalem, Gaza, Nablus, Ramallah), as well as from refugee camps in Khan Younis, Rafah, and those located near Ramallah.

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[1] Source: Middle East Internet Usage & Population Statistics (http://www.internetworldstats.com/stats5.htm).

[2] Source: Madar Research – Knowledge Economy Research on the Middle East (http://www.madarresearch.com/main/mpage.aspx)

Rural areas were represented by two villages at the outskirts of East Jerusalem (Al-'Azariyya and Dahiyat Al-Bareed), and by Kufr Al-Labad near Nablus.

Forty-one per cent of the sample are city dwellers, 35 percent come from the camps, and 24 percent from villages. The sample is evenly divided between males (52%) and females (48%). Of the city dwellers, 72 percent have a university education, 12 percent hold diplomas, and 12 percent are either students or graduates of high-schools; four percent are grade nine graduates. Among refugee camp residents, 58 percent are university graduates, 14 percent hold diplomas, and 28 percent are either students or graduates of high-schools. Two-thirds of the entire sample are between the ages of 15-25, around 20 percent are between the ages of 26-30, and the remaining seven percent are above the age of 31. The average age of males in the sample is 25.3 years, and for females it is 23.2 years. (See Table 1. A detailed breakdown of demographic characteristics of the sample is available in this chapter's Appendix).

Number	Location of Interview	Place of Residence	Gender	Age					Total
				15-20	21-25	26-30	31-35	36+	
1	Ramallah	City	Male	1	2	1	1	0	5
			Female	3	1	2	1	0	7
2	Ramallah	Camp	Male	3	1	2	0	0	6
			Female	8	3	0	0	0	11
3	Bethlehem	City	Male	3	1	2	0	0	6
			Female	5	1	1	0	0	7
4	Kufr Al-Labad	Village (Nablus Vicinity)	Male	0	1	2	1	2	6
			Female	0	2	0	1	2	5
5	Al-A'azariyya	Village (Jerusalem Vicinity)	Male	0	3	0	0	0	3
			Female	3	3	0	0	0	6
6	Dahiyat Al-Bareed	Village (Jerusalem Vicinity)	Male	5	1	0	0	0	6
			Female	3	0	1	0	0	4
7	Nablus	City	Male	1	4	1	0	0	6
			Female	1	3	1	0	0	5
8	Gaza	City	Male	1	4	3	0	1	9
			Female	0	4	1	1	0	6
9	Khanyounis	Camp	Male	0	2	3	3	0	8
			Female	0	2	2	0	2	6
10	Rafah	Camp	Male	0	3	3	0	0	6
			Female	0	3	1	1	1	6
Total				**37**	**44**	**26**	**9**	**8**	**124**

Table 1: Distribution of Focus Group Interviews by Location of Interview, Place of Residence of Interviewee, Gender, and Age[3]

[3] Palestinian population data for the West Bank and Gaza are available at http://www.pcbs.org/populati/pop03.aspx.

Findings

Ramallah City (population 24,599), excluding refugee camps*

Two focus group interviews comprising 29 respondents were held in Ramallah; one group was chosen from the city of Ramallah, and the other from the nearby refugee camps of Al-Am'ari (population 8083), Jalazon (population 9284), Qalandia (population 9188), and Um Al-Sharayit refugee camp. The majority of refugee camp participants (9) came from Al-Am'ari camp, four from Jalazon, and three from Qalandia. One participant came from Um Al-Sharayit. The composition of the refugee camp participants (n=17) shows that 35 percent are males and 65 percent females; for non-camp residents (n=12), 41.7 percent were males and 58.3 percent females. By design, the age distribution in both localities shows that the majority are young (ages 16-25), chosen purposefully to tap familiarity with computers and the Internet: 86.7 percent and 66.7 percent for camp and city dwellers, respectively. Those between the ages of 26-30 comprised 13.3 percent of the camps and 16.7 percent of city dwellers. An additional 16.7 percent of participants who came from the city were between 31-35 years of age. The educational contrast between the two groups was most pronounced. Among camp dwellers, 30 per cent had some high school education, 18 percent were high school graduates, 12 per cent completed some university education, and the remaining 40 percent held bachelor degrees. Among city dwellers, only 8.3 percent were high school graduates, 50 percent held B.A. degrees, and the remaining 41.7 percent had some form of graduate education. The employment patterns shows that 13.3 percent and 8.3 percent of camp and city dwellers, respectively, are high school students; 33.3 percent of city dwellers are university students, compared to 26.7 percent of camp residents. One-quarter of each group worked in the private sector. Employment in the public sector extended to 26.7% of camp participants, and to 16.7 per cent of the city dwellers. While none of the camp residents worked in non-governmental organizations, 16.7 percent of city respondents did.

The interviews yielded several interesting findings about computer and Internet use. Everyone in the two focus groups thought that the "computer is a good thing for society." While three-quarters of city participants have computers at home, compared to less than one-third of camp dwellers, the average daily hours spent on a computer among camp residents is higher than city residents: 3.1:2.8 hours. A minority of both city (8.3%) and camp dwellers (20%) said they have computers at school. Only one city high school student reported that she uses a computer at school to do school work. This is in contrast to three refugee students who reported using computers in school for the same reason.

Three-quarters of refugee camp respondents said that they visit Internet centres, compared to one-third of city dwellers. City-dwellers, however, reported substantially higher presence of Internet access at their university (41.7%), compared to university students from the camps (6.7%).

Of the city dwellers, three indicated that they use the Internet from home, compared to four of the 17 refugee camp dwellers. Camp residents who have Internet access at home, however, spend, on average, more hours on the Internet at school than city dwellers: 3.1:2.8 hours per day.

A minority of both groups report Internet access in high school (8.3 percent for city students, compared to 6.7 percent for camp students), but students from the camps spend on average more hours using the Internet than city students: 1.3:0.5 hours.

Of those who work, close to half of both groups of respondents said they have computers at work. Between 50 percent (city respondents) and 40 percent (camp residents) use the Internet at work; considering other locations, slightly more of camp residents use it (60%), compared to city respondents (58.3%).

Access to the Internet at school was reported by one refugee student, and similarly one student who is a city dweller reported using the Internet at school. In all cases, the reason given for lack of access to the Internet at school was attributed to the school's regulations. Between 80 percent of camp residents and 90 percent of city residents indicated that they are aware of issues connected with computer and Internet security. None of the city dwellers thought that sending information over the Internet is a secure thing, compared to 60 percent of camp refugees. When asked if their personal information was secure over the Internet, 50 percent and 87 percent of city dwellers and camp residents, respectively, said no. One-third of city residents said they did not know. When asked if they thought that their personal information was being monitored, 12.5 percent of camp dwellers and 16.7 percent of city residents said yes.

The majority of both groups reported that they are aware of privacy issues on the Internet, and various means were cited to protect personal information. Respondents from the camps mentioned changing their username once a month, others use the Internet in special places that provide firewalls, still others mentioned using "starve" Internet cards to protect against invasion of privacy. In certain cases respondents mentioned how hackers penetrated and accessed their accounts and reported the sites they visited to their employers.

More than 90 percent of both groups thought that outsiders do monitor information traffic over the Internet, and when asked to name these outsiders, 50 percent of city dwellers cited the Israeli government and its security agencies; 20 percent cited the USA and the CIA; 30 percent mentioned both the USA and Israel. As has been the case all along, camp dwellers look at the world through a highly politicized perspective. Seventy-three percent cited the Israeli government, and the remaining 27 percent were distributed evenly (9 percent each) among USA, Israel and the USA, and Israel and official Palestinian institutions.

While three-quarters of city dwellers endorsed the use of the Arabic language as a medium of communication to facilitate access to the Internet, among camp refugees the corresponding figure reached 93.3 percent.

When it comes to employers monitoring employee use of the Internet at work, several respondents from the camps indicated that their employers have a policy regarding which sites they are not allowed to access. In other cases ministries actively monitor their employees' use of the Internet. When asked if parents monitor their use of the Internet at home, those who have Internet at home dismissed the idea, saying such monitoring rarely occurs. Parents, we were told, trust their children.

Several of the city dwellers talked about the use of wireless technology as means of circumventing obstacles to accessing the Internet. In particular they saw it necessary in rural areas that are not connected to the electricity grid. A couple of city respondents attributed the slow penetration of wireless technology to the monopoly that is exercised by the Palestine Telecommunications Company.

When asked to rank Internet use in terms of usage priority, work came first, followed by contact with relatives, education, chat, entertainment, news, and finally e-commerce. There was general consensus among the respondents on the ranking order.

While the Internet was widely known – if not widely used – special features of Internet use characterize the situation in Palestine. In the case of the group from Ramallah, Internet users singled out the use of the computer to network with relatives and friends whom they are unable to see. This was particularly true among the refugee community with limited means of geographic mobility. Lack of mobility was not confined to the refugees, but affected the Palestinian population as a whole due to frequent closures and curfews that are imposed by Israeli occupation authorities. Both groups stressed how they use the Internet to contact relatives who live in neighboring countries or overseas and whom they have never seen. Use of chat rooms and MSN Messenger were singled out as means to re-establish contact with friends they had known in school or university but are unable to see face to face. The Internet was useful in two other contexts. First, to overcome conservative trends in the community which prohibit contact between males and females. This was mentioned by those who live in the conservative northern West Bank. In one case, a male respondent mentioned that he met his wife through the Internet. Second, due to frequent closures, universities and colleges in Palestine resorted to the use of the Internet as a means to deliver educational material to students.

Internet cafes occupy a special place in the Internet landscape of Palestine. Many people do not own a computer or are unable to subscribe to the Internet; this has made Internet cafes and youth centres, particularly in the camps, popular points of access. The views expressed during the focus group interviews supported the popularity of Internet cafes, in particular among male respondents. In one case, a respondent mentioned how he uses the Internet at a friend's café; the friend allowed him to spend up to six hours in the evenings accessing the Internet free of charge. These early encounters with the Internet led one (among several others) respondent to think seriously of studying information technology at university, which in this case he did.

In a wide ranging discussion of the Internet and computers, one female respondent, who subscribes to the Internet, cautioned against obsessive use of the Internet for fear that, like TV, it could lead to addiction and "mental laziness". She is against home monitoring of computer and Internet by parents and older siblings. Self-reliance and self-guidance are the methods relied upon by the respondent. She was quite aware of the danger of meeting new people on the Internet, who could introduce themselves under fall pretenses.

Although many preferred Arabic as the medium of communication over the Internet, they did acknowledge its shortcoming in the sense of not having enough search engines in Arabic. Those respondents who attended university found it easy to use English.

In several cases, the Internet became an indispensable tool for doing research. There were technical, socio-economic and political problems associated with Internet access in Palestine. When applying to get a leased Internet connection, one respondent indicated that that was not possible due to what she called "overloading" of the phone lines. University students have access to large servers which enable them to download large documents. Some pointed out how email is used to exchange, correct, and edit documents – both at work and in teaching.

As a university assignment, one female respondent described how she used her entry into chat rooms to study the phenomenon of meeting friends and meeting future marriage candidates through the Internet. In order to avoid hackers getting into individual accounts when using credit cards, some respondents opted for buying credit cards with dollar limits, say $100, after which the card expires automatically. In those instances, when knowledge of English was rather weak, respondents mentioned how the Internet became a learning source for increasing vocabulary. In one particular case, an employee of the Palestine Census Bureau of Statistics mentioned that he is connected to his workplace in emergency situations through using a satellite card where he is able to communicate from a distance such as the airport.

The issue of home monitoring of Internet use occupied a central place in the focus group discussion. The views varied from total monitoring by elders, to sporadic monitoring, to establishing a system of trust. One female respondent counseled that it is better to have a reasonable system of supervision and make the Internet available to all members of the households on a 24-hour basis; otherwise, younger members (13 or 14 year olds) will go to Internet cafes where there is minimum supervision. Downloading of music and games was common. One respondent mentioned that she worked in a radio station where music was downloaded regularly from the Internet and rebroadcast over the air. It was mentioned that those who live in Jerusalem can subscribe to DSL (Digital Subscriber Line), which would allow broadband transmission of data and images. Online purchasing, especially of books, was reported by few respondents. The delay in delivery of the books from Israel to Ramallah did not encourage the use of e-commerce. Although several respondents attempted to take workshops and courses to improve their skills in specialized programming, the cost was prohibitive to many ($800 per course).

Finally, a brief discussion ensued over the reliability, and indeed acceptability, of Internet as a source in academic research. One respondent complained that his teacher at university does not accept sources that are downloaded from the Internet, although this was contested by another respondent who said that there are ways of checking the authenticity of the sources.

Refugee Experience

Although the computer and Internet were used in various capacities among camp residents, what stood out in the interviews is the use of the Internet to connect with other refugee communities. One respondent remarked how she uses the Internet in the Women's Center to participate in the "across borders project" which brings Palestinian refugees worldwide in contact with each other. The Internet is used to send pictures as well. She narrated how she took a course to enable her to use the Internet for these purposes. She singled out Lebanon, Gaza, and Hebron as three communities in which the refugees live and who have expressed an interest in networking with other refugees.

Not everyone is an Internet or computer enthusiast. One male respondent from the Am'ari camp in Ramallah declared that he is not a "friend" of the computer or the Internet, and does not intend to become one. When pressed to say why and how he plans to contact relatives and friends who live outside the camp, he replied that all his relatives and friends are close enough that he can rely on face-to-face contact. Palestinian refugees in Lebanon are on the mind of most refugee respondents. For example, one respondent mentioned how he uses the Internet to collect background data on the refugees in Lebanon, such as their numbers, health conditions, and employment status. It is through his Internet contacts that he became aware that the refugees in Lebanon are barred by the government from working in 70 occupations.

One male respondent who works as a programmer mentioned how the Arabic language is not treated "with respect" by search engines. For example, he noted how Google would translate text from Arabic to French for free, but when the request is from French to Arabic, Google demands a fee. The discussion revolved around his French-speaking Algerian girlfriend whose Arabic dialect is difficult to understand. Because of language problems, he communicated with her in English. Although most communicate in Arabic, they use English alphabets phonetically to communicate in Arabic.

As expected, in a politicized environment the issue of using the Internet for political goals was mentioned by several respondents. One male respondent mentioned how he uses Internet chat rooms to defend against attacks on Islam, and to explain the situation in Palestine-Israel.

The views on monitoring were varied and included those who believed that employers (public and private sectors) monitor Internet users. Very few were concerned about home monitoring. In one case, a respondent mentioned that employers monitor their employees upon request from Israeli authorities.

They noted that one appeal of e-commerce is that it is often cheaper to book a hotel room or buy a plane ticket using the Internet. Most respondents were aware that the use of the Internet is beyond the reach of many people. Many respondents thought that the authorities ought to pressure the monopoly telecommunications company to lower its subscription rate so that Palestinians living in rural and poor areas can afford to get connected.

Nablus City (population 130,326)

Eleven focus group participants, six male and five female, were recruited from Nablus. They ranged in age from 19 to 26 years old, with an average age of 22.1. In addition to endorsing the importance of the computer and the Internet for Palestinian society in general, respondents stressed the need to raise public awareness of these technologies through public campaigns and special policies aimed at absorbing computer science graduates into the labor market so as to prevent "brain drain". Of the participants, five were university students, two were computer professionals (one of whom is unemployed), one was a lawyer, one a teacher, and one a white-collar employee. The majority emphasized the importance of personal motivation in developing computer skills, although a minority attributed skill acquisition to the need to strengthen the theoretical base in computer science training.

The average daily use of the computer ranged from two to seven hours. Forty percent spent an average of four hours a day on the Internet, and 20 percent spent between five and six hours per day on the Internet. Seventy per cent indicated that their knowledge of the computer and the Internet is quite good. They consider those who cannot use the computer and the Internet as "illiterate" by current technological standards. Frustration in the use of the computer was due to (1) frequent electrical power cuts; (2) technical failure of the computer which erased stored information; (3) viruses which infect floppy disks causing the virus to travel from one machine to the other; (4) theft of one's electronic address; (5) not knowing during emergency cases whom to contact to solve technical problems; (6) traffic overload which hampers access to the Internet; and (7) failure of system programs. In one case, a respondent revealed her inadequate knowledge and frustration when the computer mouse did not work, and was told by the repair shop technician that there is nothing wrong with the computer and all she had to do was to reset and restart her computer.

In describing the importance of the computer to Palestinians in general, the respondents gave several reasons which touched on national, personal and communal interests: as a means to further one's education, gain technical skills, and increase creativity by having access to worldwide information. A second cluster of uses for the computer centered around publicizing the cause of Palestine and Israel's occupation of the West Bank and Gaza, and recruiting international support for Palestine. Third, several respondents cited the Internet as a means that connects Palestinians worldwide.

Ten respondents mentioned Arabic as the main language of communication over the Internet, although eight said that they use English too.

When it came to protection of personal information over the Internet, five respondents were familiar with various means of protecting personal information, such as changing passwords frequently, installing a firewall, ignoring unsolicited emails, using anti-virus programs, and blocking advertisements. Five respondents had little knowledge about the subject.

E-commerce was not popular on the Internet due to users' lack of trust. They were wary of giving personal information regarding credit cards, although some respondents mentioned that it is possible to obtain credit cards from banks which have predetermined use values.

In terms of priority in the use of the computer and the Internet, research came first, followed by work, entertainment, news, contact with others, and finally e-commerce. Home use of the computer was subject to parental authority or supervision by older siblings.

This particular group ended the session by offering several recommendations on how to facilitate the diffusion of ICT: (1) organizing workshops on how to use the computer and the Internet that are open not just to students of ICT, but also to all those who are interested in ICT from a professional angle; (2) all schools should have computer labs to train their students in ICT; (3) local employers should recruit ICT students; (4) development of long-term national and local ICT policies; (5) the need to monitor the Internet use at home, because the "Internet is like a double-edge sword"; (6) establish ICT centres for students to meet and exchange ideas; and (7) prepare students in ICT before they start their technical programs in college.

Kufr Al-Labad (population 3,915)

Located near the city of Tulkarem, Kufr Al-Labad is a village with around 4000 inhabitants. The focus group consisted of 11 participants – six males and five females – whose ages ranged from 21 to 45 years old, with an average age of 32.45 years. The respondents were comprised of three teachers, one lawyer, one an unemployed electrician who worked as a farmer, one Ministry of Youth and Sport employee, one head of a local sports club, one travel agency employee, a housewife, and a university student.

Three of the respondents had three years of experience using the computer. Three additional respondents had five to six years of experience, two had "little" experience, one "medium" experience, and one respondent said he had more than 20 years of computer experience.

With regard to the Internet, the majority (9) had minimal experience, one person had been using the Internet for less than a year, and one had seven to eight years of experience. The majority evaluated the computer positively in terms of its research, educational, and networking potential.

The problems faced by participants when using the Internet were, in descending order of priority, the cost of Internet access, ownership of a computer, dependence of the home phone line on the Internet, lack of training for Internet usage, unreliability of electrical supply, and viruses. To solve the overriding problem of cost, several respondents suggested that the Internet cost be reduced and Internet subscriptions be made available on a fixed basis the way television licenses are paid for.

In order to cope with security and privacy issues on the Internet, respondents mentioned encryption and the use of secret codes for their passwords. However, respondents also said that it is always possible for hackers and foreign agents such as Israel to intercept personal e-mail. Other participants were concerned that Internet users do not pay sufficient attention to copyright laws when they download text, music or videos.

The majority were more comfortable in using Arabic on the Internet, although five said they use both Arabic and English. Only one respondent felt that it is easy to use English, in particular for printing downloaded documents.

In descending order, the reasons given for using the Internet were news, networking with family and friends, chat lines, academic research, general information, and entertainment.

Except for one respondent who monitored his young children's use of the computer at home, the remaining respondents described computer use on the basis of time sharing among family members.

Gaza City (population 395,262)

Gaza City is the largest population centre in the occupied Palestinian territories. Of the 15 focus group participants, nine were males and six females. Their ages ranged from 16 to 40 years, with nine respondents falling between the ages of 16 and 24. The average age for the group stood at 25.7 years. Five respondents held diplomas, seven bachelor degrees, one was a secondary school graduate, and the remaining two were a university student and a secondary school student. Of the 13 who were employed, five were in the government sector, six in the public sector, and two in the private sector. In terms of place of employment, three worked for the Palestine Census Bureau of Statistics, one managed an Internet café, another was an inspector in the Health Ministry, one was a teacher, one worked in sales, one was an accountant, and six were in various NGOs. Overall, the group was educated beyond secondary schooling, and all were engaged in white collar occupations.

There was consensus among the respondents that the computer and the Internet benefit society. Both technologies simplify life and, in particular, make the job of professional people easier. The Internet makes it possible for people to connect with relatives and friends whom they otherwise are not able to contact. But not all were sanguine about the technology. Some expressed fear that the technology could lead to computer and Internet addiction, particularly as a result of chatting. Eight of the respondents reported that they spend in excess of 20 hours per week on the computer and the Internet, and an additional three mentioned from 11 to 15 hours. Several expressed the opinion that use of the Internet by young people is fraught with moral concerns due to easy access to pornographic sites.

Each respondent had access to at least one computer at home; 11 used a computer at work; two spent between one and six hours per day using computers in Internet cafes and women's clubs. Although most participants were heavy users of the computer at home and work, this was not the case for the high school student who reported using the computer at school for less than one hour per week.

Six of the participants used the Internet at home, five at work, and four in public places. For those who had Internet at home, the average usage time varied from one and half to six hours daily, which is similar to time spent on the Internet at work. With regard to public places, users gave an average of half to one hour per day. The lone high school student in the sample spent on the average one hour on the Internet at school per week. He was careful not to use it for chatting, due to school monitoring. The university student in the group logged on the Internet a total of three hours per semester.

Here too use of the technology was described as a function of the socio-political conditions of Gaza. Because of frequent closures and constant surveillance by Israel, the Internet has become an indispensable tool for students to reach their teachers and for citizens to connect with their relatives in other places. Others reported using the Internet to make friends overseas. Few used the Internet for downloading music or playing games. The engineering student used the Internet to exchange technical information with other students living in neighboring countries and in the West.

All of the respondents were aware of privacy risks. One participant referred to personal experience in having his Internet privacy violated. However, they all concurred that there is no privacy protection over the Internet, and named Israel and the USA as the primary sources of Internet surveillance of Palestinians. Some went as far as to say that Yahoo and Hotmail are practically "Israeli sites".

Arabic is the group's preferred language of use on the Internet among 14 of the sample's respondents, although nine said that they use English as well as Arabic on the Internet, and one respondent mentioned using English more often than Arabic. In descending order, the Internet is used for chatting, work, study, networking, and e-commerce.

Khan Yunis Refugee Camp (population 47,360)

Located in the Gaza Strip not far from Gaza City, Khan Yunis is the second largest refugee camp in the Palestinian territories after Rafah camp. The focus group consisted of eight males and six females. Respondents varied from 21 to 45 years old, averaging 28.6 years old. Seven of the group members held bachelor degrees, four held diplomas, and the remaining three were high school graduates. Three were unemployed, one was business owner, and the rest held jobs in accounting, teaching, and NGOs (paid or volunteered).

Most of the respondents were frequent computer users, although three respondents classified themselves as "below average" users. The heavy use of the computer is due to work circumstances, where several respondents indicated that they use the computer between six to seven hours daily. Use of the computer at home ranged from two to four hours a day. Four participants indicated that they do not own computers due to cost. Those who do own a computer share it with other family members. All but one or two believed that the computer is an essential tool in modern society. The only problem that was singled out had to do with accessing "immoral material" over the Internet. At a more general level, one respondent remarked that the computer could be good, bad, or excellent depending on its usage. A couple of respondents mentioned that they use the computer to research and prepare school assignments. Three mentioned that they have taken short courses in how to use the computer.

Discussion of the Internet was wide-ranging. Several respondents used the Internet, or knew of others who used it, to conduct business transaction. In one case, a female respondent mentioned how her husband, who in the past relied on the postal service to receive product samples from China for sale in the Palestinian territories, now uses the Internet to display the sample to customers, thus cutting down turn-around time and cost. Views on the Internet were more stark than views on the computer. Like other focus group participants, the Khan Yunis respondents raised the moral issue with regard to children's use of the Internet. Although the extent of concern varied, all respondents expressed concern about unmonitored exposure of the young to the Internet. In certain cases, misuse of the Internet was attributed to lack of know-how. "The Internet is like a spider's web," opined one participant. "It opens horizons in various positive ways, although there is no denying the fact that it has some negative consequences. For example, a collaborator working for Israeli intelligence can use the Internet to deliver useful information to them." And he proceeded to say that he knew of a case where Israeli intelligence penetrated Palestinian servers and provided users with wrong information. But the Internet is also monitored by managers of Internet cafes. Another respondent said that between 70 and 90 percent of Internet traffic is monitored by foreign sources. Overall, respondents concurred that there is no guarantee of privacy over the Internet. In the words of one participant, "it is next to impossible to escape Internet monitoring because it is important for Israel and the USA to monitor the Palestinian people." The theme of Israel the USA and their monitoring of Palestinian usage of the Internet was mentioned several times over the course of the focus group session. "The conflict between us, the USA and Israel continues, although it is now taking a new turn after the introduction of the Internet. As well, surveillance [of Palestinian users] takes place through the use of satellite technology to disable Palestinian [Web] sites."

The Internet was also used to seek out general information, as for example in the case of a mother who turned to the Internet to find information about her child's illness. Another participant used the Internet to download student applications from European universities.

The Internet was singled out as very important for the work of NGOs because it facilitated networking at effective cost.

Arabic was mentioned as the most frequently used language on both the computer and the Internet, although there was no escaping the fact that English is also used on the Internet for the main reason that Arabic search engines are not as numerous and the information available on them is limited. Several respondents pointed out that one needs to know English in order to do proper searches for scientific topics.

Several respondents knew what e-commerce meant, but very few actually used it. One respondent bought a book through the Internet. Some respondents resorted to the cell phone (Jawal) to send messages (SMS), although it was pointed out that this is more expensive than using the Internet. A couple of respondents used the phone over the Internet, which turned out to be the cheapest method, assuming that one has access to the Internet. All participants concurred that price is the main deterrent to using the Internet, and suggested that Internet access be treated on the basis of licensing fees, the way TV sets are licensed.

Rafah Refugee Camp (population 57,839)

The twelve participants who took part in the Rafah camp interviews were divided equally between men and women. They ranged from 23 to 40 years of age, with an average age of 26.9 years. All of the males and three of the females were university graduates; of the three other females, two held diplomas and one was a high school graduate. Ten were employed at the time of the interview and two were unemployed. Except for one or two respondents, the majority held government jobs or were employed in the NGO sector. Six of the participants indicated that they own a computer.

Four respondents use the Internet at home, five use it at work, two at school, and two in clubs and Internet cafes. The time spent using the computer varied from two to seven hours per day at work; from two to four hours at home; and roughly two hours daily in clubs and Internet cafes. The computer was used at school by one person who happens to be a teacher, and the other university student in the sample uses the computer on the average hour and half hours daily to study and prepare reports.

Although the majority described the computer in positive terms, all expressed frustration in the use of the computer and the Internet due to interruptions of electricity, viruses, or slowness in accessing the Internet. Similar to what we have heard throughout the focus groups interviews about appreciation for the computer and Internet, here too respondents expressed serious reservations regarding security of their files, their password, and identity when accessing the Internet. As well, concern was expressed about children accessing pornographic sites on the Internet. Use of the Internet for chat exposed many participants to unwelcome "intruders". In descending order, the Internet is used first for work related activities, followed by chat, study related activities, contacting relatives and friends, browsing for news, and e-commerce. Overall, the Internet is used to browse in media outlets. The NGOs and non-profit organizations underscored the importance of the Internet for networking, disseminating information, and maintaining contact with donors.

Most of the participants acknowledged that there is no privacy on the Internet. Two to three participants mentioned that their private email and password were intercepted. Others mentioned that their information on the Internet, particularly when engaging in chat, is compromised. All respondents stressed that the Internet is monitored by Israel and the United States, particularly those who use Hotmail and Yahoo accounts.

Five indicated that they only use Arabic on the Internet. Three indicated that Arabic is their primary language, but they can use English if the need arises. One indicated that he uses Arabic and English equally. Only one uses English more often than Arabic, and one uses both Arabic and Hebrew.

Use of the Internet at home is not prioritized. However, they all stressed the need for the Internet to be monitored at home. Although they were familiar with the use of the Internet to buy goods, only one participant tried to purchase products on the Internet, but this transaction had to go through a local agent. One respondent mentioned that her relatives use the Internet for commercial purposes.

Respondents were familiar with the wireless Internet technology. However, this service is not available in Rafah. Others pointed out that Paltel, the private Palestinian carrier, is a monopoly, which makes it difficult for competitors to operate from Rafah.

Bethlehem (population 29,019)

Thirteen participants took part in the focus group interviews in Bethlehem – seven females and six males. They ranged in age from 15 to 29, with an average age of 20.9. Four are university graduates, five are university students, one is a secondary school graduate, and the remaining three are in preparatory and high school. Of the five employed people, three work in the NGO and public sectors, and the remaining two in the private sector.

Time spent on the computer and the Internet varied: from 10 to 12 hours per week (two respondents), five hours per week (five respondents), four hours per week (two respondents), three hours per week (one respondent), and two hours per week (two respondents). On the average 5 hours were spent per week on the computer and the Internet. Of the 13 respondents five used the technology for communication, research, and search for general information. Two respondents used it for email and work purposes, additional for communication and news searches, and the remaining two used it for email only.

Overall, the respondents thought that the computer and the Internet are beneficial for society, although some cautioned that the "information revolution" may lead to a cultural domination by the West. Overindulgence in the use of computers and the Internet could lead to a form of addiction, with negative health consequences and distraction of students from their school work. Frustration in the use of the computer was mentioned by most participants. This was attributed to the slowness of the Internet and computers. Viruses were singled out as an important factor in causing frustration in computer use.

Twelve of the participants mentioned that they have at least one personal computer at home. Five stated that they use the computer at work, four use it in Internet cafes and social clubs. Unlike the two university students who access computers in college, none of the high school students said that they have access to computers in school. Ten respondents indicated that they use the Internet at home, three at work, and seven in Internet cafes and social clubs. Two use the homes and offices of friends to access the Internet, while the university students use the Internet at school.

Use of computers is linked to Internet access, typing of work- and school-related reports, planning, computer assisted design, and information gathering. In one or two cases, the computers facilitated access to the Internet for the sake of conducting e-commerce. Overall, participants were satisfied in regulating the use of the computer in the workplace and at home. With regard to the Internet, its use was wide ranging and included messaging, phone, and transmission of live and still pictures at reasonable cost.

It is interesting to note that the use of the Internet for the purpose of messaging was not confined to contacting acquaintances in far away places, but included close-by friends and relatives in the West Bank and Gaza where geographic mobility is limited due to closures and curfews. The respondents estimated that they spend between one to four hours per day on audio and video messaging.

The respondents were familiar with issues of privacy and security in connection with the use of the Internet. However, after some prompting and explanation, one female respondent pointed out that privacy is of great value to her personally, while another male participant noted that his work demands security of information, and pointed out that privacy and copyright legislation is non-existent in the Arab world. They all concurred that personal information is not secure on the Internet. Three mentioned that their personal email had been intercepted, and their identities stolen. When asked if governments target and spy on Internet users, the majority agreed that this does happen. However, with regard to the Palestinian Authority several noted that even if the PA wished to do this, it lacked the technical and physical means to do so.

In terms of language use and in descending order, the participants singled out Arabic as their preferred language for both computer and Internet use, followed by English, French and Hebrew. Nine participants mentioned that they are compelled to use English because of the quality of information available on the Internet through English search engines. Two respondents indicated that they are familiar with translation on web sites. In descending order, the Internet was used first for contacting relatives and friends, work, entertainment, news and political coverage, e-commerce, and education.

Finally, when asked to assess family control of computer and Internet access at home, eight of the respondents saw there was no problem in access, although the parents on occasions deterred family members who are still in school from spending too much time on the Internet. Four respondents mentioned that their families draw up plans regarding times of computer and Internet use, depending on need and priority. One respondent mentioned that at times he faces problems due to the number of users and the fact that older siblings tend to monopolize computer use. The group reiterated that there is no gender or age discrimination in using the computer at home.

Dahiyat Al-Bareed (population 24,838), and Al-'Azariyya (population 16,838)

These two villages are situated at the outskirts of East Jerusalem. A total of 19 respondents were interviewed: nine from Al-'Azariyya and ten from Dahiyat Al-Bareed. Of the former, six were females and three males. The latter group had six males and five females. The ages varied from 15 to 24 with an average age of 17.8 years in the case of Al-'Azariyya, and 15 to 19 for Dahiyat Al-Bareed with an average age of 18.5 years. In the case of Al-'Azariyya, six respondents were university students, two were in preparatory school, and one was employed as a college lecturer. In Dahiyat Al-Bareed, the majority were students – six in high school, one in preparatory school and two in university. One respondent worked as an administrator in a law office.

Time use of the computer and Internet in the case of Al-'Azariyya varied from one to three hours per week (four people), one to two hours daily (two people), to three to six hours daily (five people). Dhahiyat Al-Bareed had the following distribution of computer and Internet use: four to five hours daily (six people), one to two hours weekly (two people), and one to two hours daily (three people). The majority of respondents ranked themselves quite knowledgeable in computer and Internet use. One or two people indicated that they are not regular users of the technology, and one in particular expressed serious reservations about it.

Frustration in computer use and Internet access was experienced by all participants. These were caused by insecure Internet connections, unexpected power cuts, high traffic on the Internet, slowness of data transmission, and viruses. One person cited the lack of someone to correspond with on the Internet. They all agreed that the technology has its positive and negative aspects. The outcome depends on the user and the purpose for which the technology is used. Two respondents from Dahiyat Al-Bareed remarked that computers could isolate individuals from their surroundings and as such could contribute to psychological problems. Cost and lack of sufficient number of Internet cafes and community centres equipped with the Internet were cited as factors inhibiting access to the Internet.

The home is the centre for computer use, although more than one-third of the combined groups mentioned that they have computer access at work as well. A similar proportion uses the computer at home as well as in Internet cafes. The two university students in the group have campus access to computers and the Internet. Several of the combined sample knew about data protection and viruses. They also pointed out, without specifying the source, that spying on users does take place on the Internet. Several knew of various programs that are used to protect Internet users from identity theft and unlawful access to their data. Use of computer at school was conditional on teachers' supervision. Four respondents from Al-'Azariyyah mentioned that their older brothers monitor computer use at home. Others used passwords to protect their files stored on the computer. In Dahiyat Al-Bareed, a couple of respondents referred to their mothers as the main decision makers regarding use of computer and Internet.

Of the Dahiyat Al-Bareed, three individuals resort to English first in using the Internet, followed by Arabic; four use Arabic only; two use English only; and the rest use combinations of English and Arabic. Respondents from Al-'Azariyyah said that Arabic is their predominant language, followed by English. Some mentioned that at school the teacher obliges them to use Hebrew.

Suggestions on how to improve access to the Internet and computer centred on the following: increase the number of hours in which the computers are available in schools; organize summer camps to train students in the use of the Internet and the computer; lower Internet access cost; mount a campaign to make the public aware of the importance and benefit of computers and the Internet; increase in the number of Internet Service Providers; allow for a system of prior reservation at Internet cafes and increase the number and location of Internet cafes and community centres; provide publicly accessible terminals in large cities and on main streets; and expand the telecommunications network and provide larger number of telephones at reduced cost.

Conclusions

Several commentators have pointed out that one of the unintended effects of the latest Intifada, if not the entire Palestinian-Israeli conflict, is to increase reliance on ICT, particularly the use of the Internet for the purpose of reaching out beyond the borders of Palestine to convey the texture of life under occupation and maintain contact with Palestinians world wide. Thus, in spite of poverty which extends to nearly 70 percent of the population in Gaza and to 50 percent in the West Bank, the occupied territories have experienced increase in the diffusion of ICT generally, and with it came the need to acquire skills in the use of the technology.

A small-scale study by the Panorama NGO in Ramallah, based on a sample of 800 Palestinian university and secondary school students from the Jenin area, examined Internet use, presence of computers in the home, computer skills, parental attitudes to ICT, and educational experience with ICT. The highlights of the study are as follows:[4]

1. Sixty-eight percent of young people said that there are computers in the home; 28 percent reported Internet connection at home; 70 percent said that they have satellite dishes in their homes; and 76 pecent use cellular phones.
2. When asked to rate the quality of the ICT sector in the Jenin area, two-thirds said it is lower than the rest of Palestinian towns, with 34 percent reporting it is about the same level.
3. When asked in a follow-up question to give reasons for the low ranking of Jenin compared to other towns, 47.6 percent mentioned Israeli occupation, 15.4 percent cited weak private sector; bad infrastructure was mentioned by 21 percent; and the remaining 16 percent referred to the community.
4. Close to 90 percent agreed with the statement that Israeli occupation has increased, in their view, the importance of the ITC sector.
5. The majority of respondents agreed that the educational system does not provide adequate training in the use of ICT equipment, and that the schools stress theoretical over practical knowledge with regard to ICT. The majority of these students mentioned individual initiative and self-teaching as the main methods of ICT training.
6. Parents saw a negative moral impact as far as ICT is concerned, particularly with regard to women's access to web sites on the Internet. Use of the technology by parents is directed mainly toward males in the family.

Detailed quantitative analysis of ICT diffusion in Palestine will be carried out in the next chapter. It is sufficient here to summarize the qualitative findings of the 10 focus group interviews as a prelude to further discussion. First, it appears, among the purposefully selected group of interviewees, that there is widespread familiarity with the Internet and computer usage. Second, at the pre-college level the schools do not seem to play any active role in training students in the use of the technology. The skills acquired are more a product of "learning by doing" than the result of systematic hands-on instruction in school. Third, contrary to the fear expressed by various observers, the home does not appear to exert a controlling effect on Internet and computer usage. This does not mean that Internet usage is not monitored at home, particularly where young users are concerned. But for the young adults in the sample, both males and females, supervision by parents or older siblings is not an issue. Fourth, the main impetus for using the Internet is the desire to establish contact with friends and family members. The fact that Palestinians live under occupation with restricted freedom of movement has made the

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[4] Source: Panorama. "Information Technology in Jenin: a limited survey of attitudes to information technology among a sample of 800 people." Ramallah, Palestine, 2003 [in Arabic].

technology indispensable. Fifth, practically all of the participants in the focus group interviews were white collar workers and students. Those who are in the labor force rely heavily on computers, and most – but not all – have access to the Internet at work. As is the case elsewhere, here too workers' use of the Internet is monitored by employers, in both the private and public sectors. Sixth, cost of Internet connection was cited as the greatest deterrence against having Internet access. This explains the popularity of Internet cafes, youth clubs and community centres. Seventh, several respondents mentioned the lack of fair competition in the telecommunications sector, and were fairly critical of the Palestinian carrier for its high subscription rates and unavailability of land phone lines in remote and rural areas. To remedy the situation, respondents suggested instituting fixed subscription rates for Internet usage, fashioned after television license fees. Ninth, the most salient feature of Internet usage in Palestine related to issues of privacy, surveillance and monitoring by foreign governments – Israel and the USA in particular. Such appraisal was cited in almost every location in which the focus group interviews were held. Finally, all respondents noted that privacy and secure information flow on the Internet are non-existent. Several of the respondents had experience with hackers and suffered from viruses in their computers. Although they knew about firewalls and installing special anti-virus software, the majority chose to change their passwords regularly to avoid identity theft.

Appendix

Number	Location of Interview	Place of Residence	Gender	Education						Total
				Preparatory	Some Secondary	Secondary	Diploma	Some University	University	
1	Ramallah	City	Male	0	0	0	0	1	4	5
			Female	0	2	0	0	1	4	7
2	Ramallah	Camp	Male	0	0	2	0	1	3	6
			Female	0	5	1	0	1	4	11
3	Bethlehem	City	Male	0	0	1	0	3	2	6
			Female	2	1	0	0	2	2	7
4	Kufr Ellabad	Village (Nablus Vicinity)	Male	0	0	0	0	0	6	6
			Female	0	0	0	1	1	3	5
5	Al A'azariyya	Village (Jerusalem Vicinity)	Male	0	0	0	0	2	1	3
			Female	2	0	0	0	4	0	6
6	Royal-Dahiyat albareed	Village (Jerusalem Vicinity)	Male	0	5	0	0	1	0	6
			Female	1	1	0	0	1	1	4
7	Nablus	City	Male	0	0	0	0	4	2	6
			Female	0	0	0	1	1	3	5
8	Gaza	City	Male	0	1	1	0	1	6	9
			Female	0	0	0	5	0	1	6
9	Khanyounis	Camp	Male	0	0	0	3	0	5	8
			Female	0	0	3	1	0	2	6
10	Rafah	Camp	Male	0	0	0	0	0	6	6
			Female	0	0	1	2	0	3	6
Total				5	15	9	13	24	58	124

Table 1: Distribution of Focus Group Interviews by Location of Interview, Place of Residence of Interviewee, Gender, and Level of Education

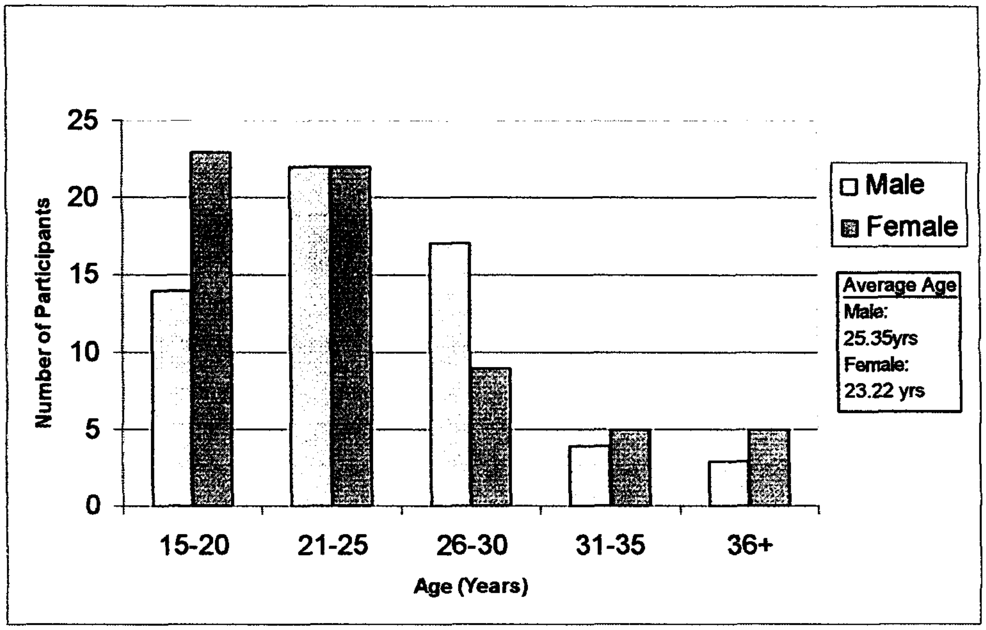

Chart 1: Distribution of Focus Group Interviewees by Age and Gender

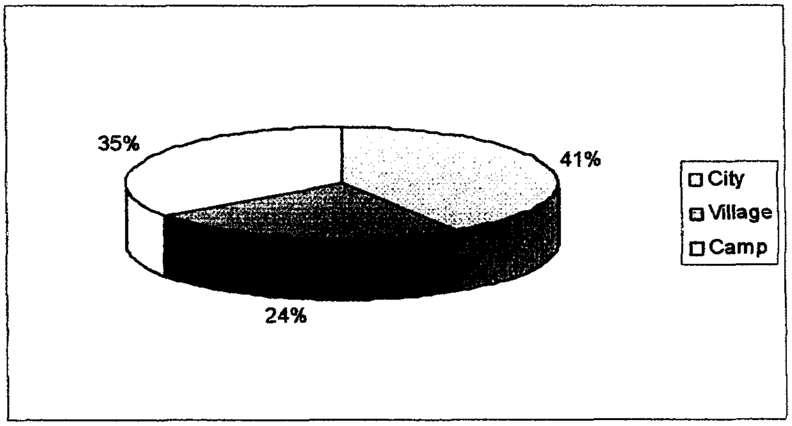

Chart 2: Focus Group Participants by Place of Residence

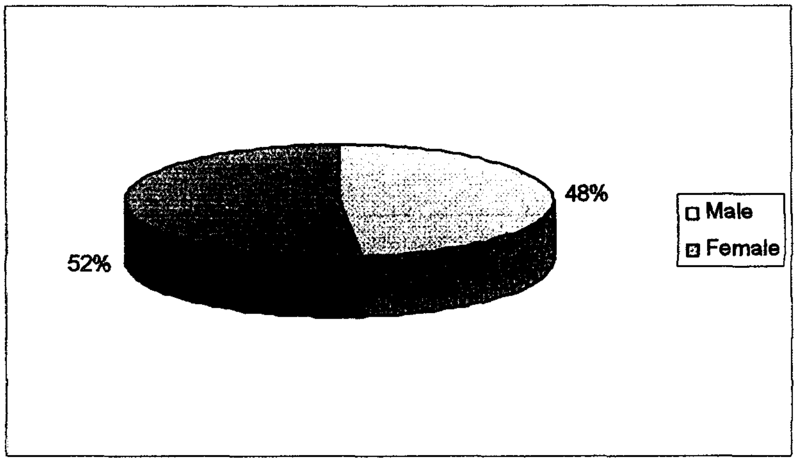

Chart 3: Focus Group Participants by Gender

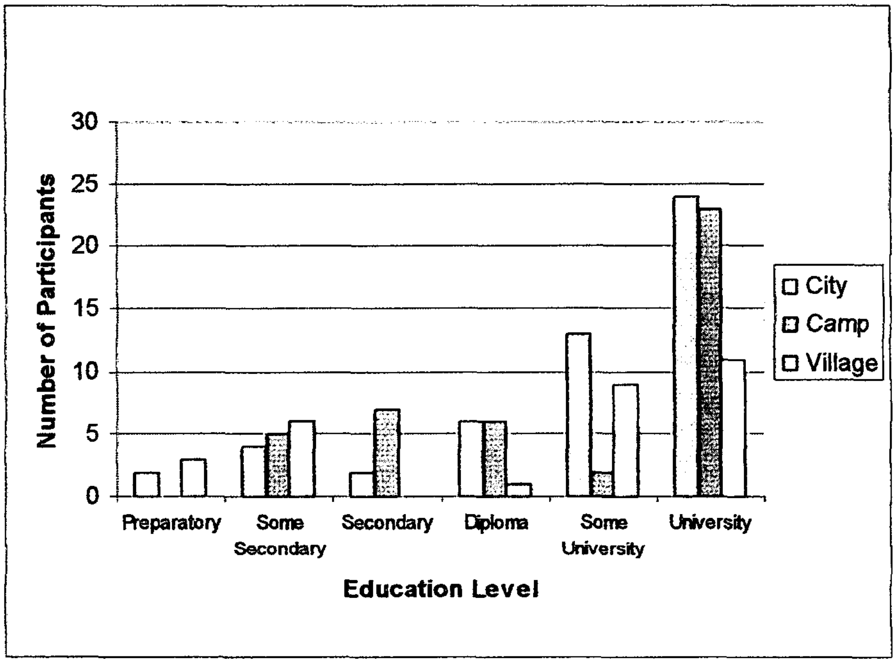

Chart 4: Educational Attainment by Place of Residence

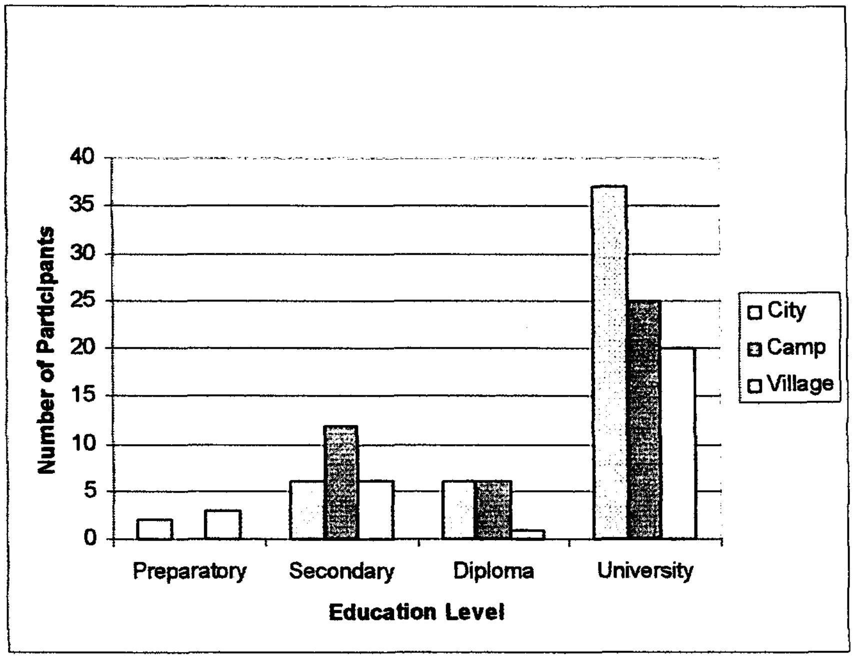

Chart 5: Educational Attainment (Collapsed) and Place of Residence

Demographic and Social Correlates of Information and Communication Technology in Palestine

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Table of Contents

Introduction

No systematic studies of the social, economic and political correlates of individual or household ownership and use of information and communication technology (ICT) in the West Bank and Gaza exist, let alone assessments of the human capital and infrastructure needed to facilitate ICT diffusion and transition to a knowledge-based economy.

Following the Oslo agreement in 1993, using ICT to spur social and economic developments in the West Bank and Gaza became a staple in policy recommendations from the World Bank, the International Monetary Fund, and the United Nations for Development Program, to donor countries in the European Union, the United States Agency for International Development, and others.* This is understandable bearing in mind that Palestine lacks natural resources to speak of, and has historically prided itself on its human capital and resourcefulness.

While the previous chapter dealt with qualitative data derived from focus group interviews, this chapter provides basic demographic and sociological data pertaining to ICT in Palestine. This will include statistical analysis to determine the correlates of ICT ownership and use in Palestine. As well, logistic regression will be carried out on certain ICT indicators. Three main components of ICT indicators will be discussed: the diffusion of telephony (land-based telephones and cellular telephones), Internet subscription and use, and ownership and use of computers. The chapter concludes with a section dealing with an ICT index that is built by combining ownership of telephones, cell phones, computers, printers, and subscription to the Internet.

Description of Samples

This chapter will summarize and analyze national surveys of ICT that were carried out in the West Bank and Gaza by the Palestine Census Bureau of Statistics (PCBS). The first survey was carried out in 1999, and included several items dealing with ICT. The second survey provided the data set for this chapter's analysis. The data were obtained under license agreement from the PCBS. The second survey, which dealt with computer ownership, Internet usage and cell phones, was carried out in July and August of 2004. The third short survey, which assessed the Palestinian public's reaction to Direct Internet connection without a subscription fee, was carried out in April 2005. The second survey consisted of 7557 households (4992 in the West Bank and 2565 in Gaza), and was aimed at the head of the household and at randomly chosen individuals - one from each household ten years of age and above. The 2005 survey consisted of a subset of the 2004 sample, and was confined to those respondents who indicated in the 2004 survey that they owned a computer and telephone line. A sample of 739 households (444 households in the West Bank and 295 households in Gaza) was chosen for the third survey. Of the 739 households contacted, 683 interviews were completed (407 households in the West Bank and 276 in Gaza). Although summaries will be provided of all three surveys, the focus of the statistical analysis in this chapter will be the second survey since it was comprehensive in its coverage of ICT. A brief note on the methodology of the 2004 national survey is presented in Appendix C.

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* See the bibliographic chapter at the end of this report.

Overview of Findings

Rudimentary public opinion surveys in the West Bank and Gaza that were carried out in 1998 by the Centre for Palestine Research and Studies (CPRS) indicated that 27 percent of Palestinians owned satellite dishes, and 12 percent owned personal computers. Of those who owned computers, 7 percent were Internet subscribers, and about 2 percent had Internet access at work. These preliminary data further revealed that computer ownership and Internet access are concentrated in large urban centres like East Jerusalem, Gaza City, Hebron, and Ramallah (CPRS 1998). A year later, another private survey by the CPRS reported an increase in ownership and access to ICT: 45 percent of Palestinian homes owned telephones and 38 percent owned satellite dishes. Home computer ownership stood at 13 percent, Internet subscription reached 14 percent of those who owned computers at home, and 5 percent among those who had computers at work (CPRS 1999).

An examination of data released by the PCBS and based on its 1999 survey of 7559 households reveals regional, educational, occupational, and gender imbalances in the distribution of basic ICT indicators. Although the survey did not aim to map ICT distribution in Palestine in any detail, it contained useful information for establishing a benchmark for the evolution of ICT in Palestine. In summary form, the national survey showed the following:

- Whereas the north and centre of the West Bank account for slightly less than half of the population, between them they garner close to two-thirds of computer ownership. The Gaza Strip, which has one-third of the population, accounts for 14 percent of computer ownership.
- Three-quarters of computers are found in urban centres; 17 percent in rural areas; and 7 percent in all the refugee camps combined.
- Forty-eight percent of households in which the head of the household has a professional, technical, or senior civil service job own computers. At the time, such households accounted for about 18 percent of the general population.
- More than half of all computers are found in homes where the head of the household has post-secondary education. Adding those with grades 11 and 12 education increases the percentage of households owning computers to 75 percent.
- PCBS estimates that in order to raise the then level of computer ownership in Palestine from 6.9 percent to 20 percent (i.e., from 33,867 to 143,371 computers), the West Bank needs to acquire 66,593 additional computers and Gaza 43,011 computers. Half of the estimated new acquisitions of computers would go to rural areas and refugee camps.
- Overall for the Palestinian territory the required increase in computer acquisition amounts to 342 percent – 891 percent for Gaza and 229 percent for the West Bank.
- As shown in Diagram I, a decade ago, the proportion of Palestinian households which simultaneously owned a personal computer, had a phone and subscribed to Internet connection reached a meagre 2 percent of the households.

Diagram I
Telecommunications Funnel
On the Household Level*
(1999 Media Survey)
(weighted sample)

Ownership of Telephone Lines

W. B.	Gaza	All
45.0%	36.5%	42.1%

Ownership of Personal Computers

W.B.	Gaza	All
11.4%	9.6%	9.8%

Simultaneous Ownership of
Telephones and Personal Computers

W.B.	Gaza	All
8.9%	6.8%	8.2%

Simultaneous Ownership of
Telephones, Personal Computers and Internet Subscription

W.B.	Gaza	All
2.3%	1.1%	1.9%

*Data collated from www.pcbs.org/culture/media00_tab_1st.aspx

How do the figures of 1999 displayed in Diagram I compare to the 2004 data? Although comparable data on all ICT indicators is not currently available, it is possible to draw a comparison of *basic* ICT indicators, as shown in Table 1.

Table 1
Basic ICT Indicators in Palestinian Households
1999 and 2004
(Weighted Samples)

	Gaza		West Bank		All	
	1999	2004	1999	2004	1999	2004
Household Ownership of Computers	9%	25.4%	11.4%	31.5%	10.8%	29.4%
Household Telephone Lines	36.5	39.7	45.0	44.8	42.1	43.0
Internet at Home	4.7	8.1	5.7	10.5	5.4	9.7
Cell Phone Use	29.8	64.1	51.0	77.6	43.7	72.8

Source: Data for 2004 are taken from summary tables presented in a PCBS Press Release, *Computer, Internet and Mobile Phone Survey, 2004. Main Findings*, Ramallah, West Bank, December 2004, Table 1, page 8. Data for 1999 were obtained from the PCBS Press Release, *Results of the Visual Information Means and Computer Survey*, Ramallah West Bank, 2000, regarding a survey of 7559 households in the West Bank and Gaza concerning ownership of computers and access to the Internet www.pcbs.org. Both data sets are based on weighted samples.

While these diffusion rates of ICT indicators do not show terribly large increases in absolute numbers over the period under consideration, the relative change is substantial in all technologies, except for diffusion of fixed telephone lines. The rate of Internet penetration has doubled within five years, while ownership of personal computers increased by three-fold. Use of cell phones (but not individual ownership) extends to three-quarters of Palestinian households. A more comprehensive list of ICT indicators is provided in Table 2. More will be said in another part of the chapter about the correlates of basic ICT indicators through the establishment of an ICT Index.

Table 2
Selected ICT Indicators for Palestine
According to Household and Individual Ownership
(2004 weighted sample)

Indicators	Percent
Household Ownership of Land-line Phones	39
Individual Ownership of Cell Phones	32
Household Ownership of Computers	29
Households with Modems	13*
Households with Printers	23*
Households with Scanner	17
Household Subscription to the Internet	10
Internet Users from anywhere	35
Household Members with Web Sites	5
Households with Digital Camera	12

*When prorated on the basis of computer ownership, 51% of the computers in the unweighted sample have modems in them, and 37% have printers attached to them.

If we now concentrate on an overview of the 2004 PCBS social survey, we notice the following trends:

- When broken down by region and gender, 35.5% and 42.1% of males have access to computers in Gaza and the West Bank, respectively, compared to 28.9% for females in Gaza and 32.9% in the West Bank. For Palestine as a whole, the figures average as 39.8% for males and 31.5% for females. In terms of ownership of computers, 26.4% of Palestinian households in the unweighted sample have computers in their homes, with the West Bank registering 28.4% compared to 22.5% for Gaza.
- In terms of place of usage of computers, 47% report the home, followed by educational facilities (21.7%), Internet cafes (9.1%), workplace (8.4%), friend's home (7.6%), and the rest (6.2%) use computers in clubs, youth centres, and other places.
- When asked to rank computer uses by priority, entertainment came out first (40.5%), followed by study (32.1%), and work (9.3%). More than 40% of the females used the computer primarily for study purposes, in contrast to 24.2% for males.
- Although only 10% have Internet at home, around one-third of those sampled use the Internet through connections from various places. There are stark differences between males and females: 40.7%:23.7%. Of those who use the Internet, 38.4% use it at home. Females use it substantially more often at home (53.3%) compared to males (31.6%). Among males, 39.1% use the Internet at Internet cafes, while 15.6% of the females do so. Gazans (40.5%) in general use email more often than West Bankers (27.5%). Females use the Internet at school (15.6%) more frequently than males

(8.9%). Males, however, use the Internet at work (14.5%) more often than females (5.1%).

- More than one-third (37.9%) reported that they know about the Internet but do not use it. Slightly more females (42.3%) fall into this category than males (34.5%).
- Two-thirds of those who use the Internet have email address, with slightly more males (68.3%) than females (59.2%). Of those who have email, the overwhelming majority use it for personal networking (93.3%), followed by education (36.1%), work (19.3%), and e-commerce (4.1%).
- When asked about the reasons for not using the Internet, 40% mentioned unavailability of the service, followed by lack of knowledge (25.3%), and no need (19%). It is interesting that only 7.8% mentioned high cost of the service. Slightly more females (29.6%) than males (21.2%) said they do not know how to use the Internet.
- Thirty percent reported that they own a cellular phone – 34.6% for the West Bank and 21.7% for Gaza.

Correlates of ICT

Land-Line Telephones

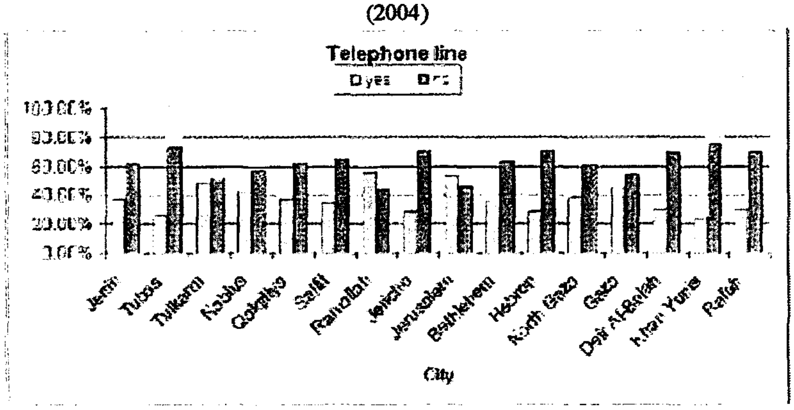
In developed countries, the telephone is considered an essential component of the bundle of social services that include education, policing, clean water, clean air, and electricity. Between 80 percent and 90 percent of the population in these countries have telephones in their homes. As part of the third world, however, Palestine lags behind substantially in terms of household ownership of telephones. The Palestinian Telecommunications Company (PALTEL) provides telephones to 90 percent of subscriber households; the remaining 10 percent use Israeli companies. There are no statistically significant differences in ownership of telephones between refugees and non-refugees, and camp refugees and non-camp refugees. There are, however, regional variations: the West Bank shows slightly higher penetration rates than Gaza (40.8%:36.8%), and rural areas have substantially lower penetration rates than urban ones (45%:27.2%). When considering penetration rates for urban and rural areas for each of the West Bank and Gaza, Table 3 shows the pronounced contrast in rates from a low of 14.3% for rural Gaza to a high of 53.6% for urban West Bank. As well, Chart I shows that telephone penetration across Palestinian cities varies from a high of nearly 60 percent for the city of Ramallah in the West Bank, 50 percent for East Jerusalem, and around 20 percent for Khan Yunis in the Gaza Strip. When penetration data is partitioned taking into account region and locality, there are significant differences (see Table 3).

Table 3
Availability of Telephones in Households by Region and Locality
(weighted sample)

Region & Locality	Have Telephone	Don't Have	Total	N =
West Bank, Urban	53.6	46.4	100.0%	2245
Gaza, Urban	40.5	59.5	100.0%	1395
West Bank, Rural	32.1	67.9	100.0%	1502
Gaza, Rural	14.3	85.7	100.0%	119
Total	2268	2993		5261

Chi-Square = 219.861   df = 3   p = .000

Chart I
Distribution of Telephone Lines in Selected Palestinian Cities
(2004)



Telephone ownership is also correlated with socio-economic indicators. Tables 1 and 2 in Appendix A present availability of household telephones by occupational background and educational attainment of the head of the household. Two-thirds of those households classified in the administrative and professional categories have telephones, compared to 17 percent among those who work in agriculture and 23 percent of unskilled workers and vendors. By the same token, two-thirds of those with post-secondary education have telephones at home, compared to one-quarter of those with primary education and lower.

Cellular Telephones

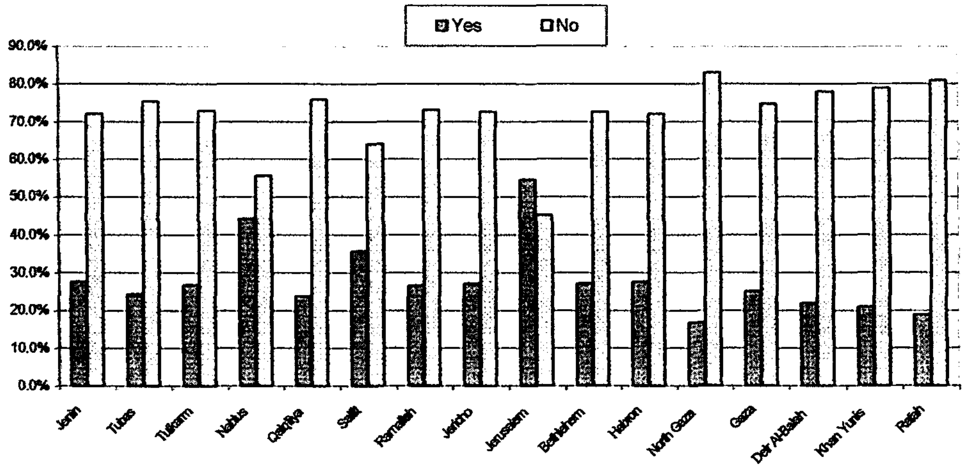
Nearly one-third of Palestinians own cellular phones with significant gender differences, as shown in Table 4. Chart II presents cellular phone ownership data for the weighted sample by selected cities in the West Bank and Gaza. Almost 55 percent of those in East Jerusalem have cell phones, 44 percent of those in Nablus, 36 percent in the village of Salfit in the West Bank, and between 20 and 30 percent for each of the remaining towns, except for Rafah (18.9%) and North Gaza (16.9%). Rural areas have lower penetration rates (26.3%) compared to urban centres (32.6%), and the West Bank (34.6%) has more cell phones than Gaza (21.7%). When analyzed by region and locality, urban West Bank has the highest penetration rates (39.3%), followed by rural West Bank (27.3%), urban Gaza (21.9%), and rural Gaza (13.6%). There are hardly any differences between refugees (28.8%) and non-refugees (30.9%). In terms of age, the highest group of cell phone owners is between the ages of 30-40 (48.5%), followed by the 20-29 year-olds (45.5%). Fully 66 percent of those with post-secondary education have cell phones, and between 75 and 78 percent of those in the administrative/managerial and academic/professional groups own cell phones.

Table 4
Ownership of Cell Phones by Gender
(weighted sample)

Ownership	Male	Female	N =
Yes	45.1%	14.6%	1868
No	54.9	85.4	4359
Total	100.0%	100.0%	
N =	3146	3081	6227

Chi-Square = 690.983 df = 1 p = .000

Chart II
Ownership of Cell Phones by City



According to the 2004 survey, PALTEL, through its Jawwal cell phone subsidiary, serves 41 percent of cell phones in the West Bank and Gaza. The remaining 59 percent use one of five Israeli companies: Celcome (33.6%), Orange (18.7%), Motorola (3.7%), Pelephone (2.5%), and Mertes (0.5%). Palestinian cell phone users in East Jerusalem and its environs use Israeli companies. As well, cell phone users in the rest of the Palestinian territories wishing to communicate with Israel by cell phone are compelled to use Israeli providers. The Palestinian Authority is not allowed, according to the Oslo agreement, to install transmitters with signals capable of reaching areas outside its jurisdiction (such as Israel and beyond) until a final settlement is reached between Israel and the Palestinians. Very few cell phone users buy subscriptions to cell phones. Between 80 and 90 percent use phone cards to operate their cell phones.

The Internet

Household Subscription

A survey that was carried out in August-September 2005 by the Palestinian Centre for Public Opinion indicated that 13.1 percent of Palestinian homes are Internet subscribers (see PCPO Poll 142 Press Release, 7 September 2005). This is a slightly higher subscription figure than the one reported in the 2004 survey. In the case of the latter, the Internet is available in 10.3 percent of Palestinian homes, with a statistically significant difference between urban (13.0%) and rural (4.2%) areas (see Table 5). There are slight differences in Internet penetration between the West Bank (10.5%) and Gaza (8.1%) (see Table 6). Similar to telephone data, the most pronounced differences emerge when the data is partitioned simultaneously along region and locality dimensions, as shown in Table 7. Urban West Bank has the highest rate of Internet penetration (15.5%), followed by urban Gaza (8.9%), rural West Bank (4.4%), and finally rural Gaza (1.7%). Among non-camp refugee households, 11 percent have Internet service, compared to 7 percent among camp refugees. For the refugee vs. non-refugee population, each group shows 10 percent availability of Internet service in households.

Table 5
Household Internet Subscription by Locality
(weighted sample)

Locality	Have Internet	Don't Have	Don't Know	Total	N =
Urban	13.0%	86.8	0.2	100.0%	3639
Rural	4.2%	96.2	0.6	100.0%	1621
Total	10.3%	89.4	0.3	99.9%	
N =	541	4701	18		5260

Chi-Square = 96.660 df = 2 p = .000

Table 6
Household Internet Subscription by Region
(weighted sample)

Region	Have Internet	Don't Have	Don't Know	Total	N =
West Bank	10.5%	89.1	0.3	99.9%	4017
Gaza	8.1%	91.5	0.4	100.0%	2210
Total	9.7%	90.0	0.4	101.0%	
N =	602	5603	22		6227

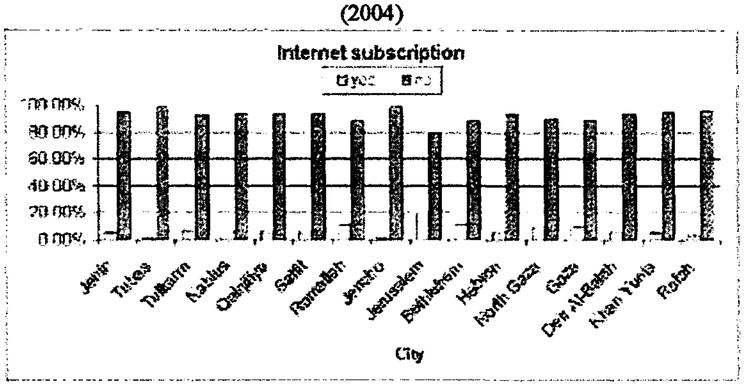
Chi-Square = 9.646 df = 2 p = .008

Table 7
Household Internet Subscription by Region and Locality
(weighted sample)

Region/Locality	Have Internet	Don't Have	Don't Know	Total	N =
West Bank, Urban	15.5%	84.2	0.2	99.9%	2245
Gaza, Urban	8.9%	90.8	0.3	100.0%	1394
West Bank, Urban	4.4%	95.1	0.5	100.0%	1502
Gaza, Rural	1.7%	98.3	0.0	100.0%	119
Total	10.3%	89.4	0.3	100.0%	
N =	541	4702	17		5260

Chi-Square = 138.938 df = 6 p = .000.

Chart III
Internet Subscription in Selected Palestinian Cities
(2004)



The majority of Internet subscribers use dialup service (77.9%), followed by ADSL (14.5%), satellite (1.0%) and other (6.6%). Three-quarters of those reporting using the Internet indicated that they used the Internet during the month previous to the survey. Only 1.5 percent reported using it for more than a year prior to the survey. These figures attest to the infancy of Internet use in Palestine. Data on Internet subscription confirms the imbalance in the distribution of ICT in Palestine. For example, three cities in the West Bank – East Jerusalem (20.2%), Ramallah (11.4%), and Bethlehem (11.8%) – garner among them 43 percent of Internet subscribers in Palestine (see Chart III).

In order to encourage Internet use, in January 2005 PALTEL introduced its so-called Direct Internet Service, also known as Subscription Free Internet (SFI). PALTEL's press release about SFI described the rationale in the following points:

1. To increase the use of Internet by making Internet service available for all fixed lines in Palestine, at the same price and quality.
2. To spread computer culture and increase Internet browsing by offering Internet access without subscription fees. This will contribute to the development of the community, as well as raise cultural and technological awareness.
3. To facilitate access to the Internet for all Palestinians.
4. To put Palestine on the map of the developed world in the field of information technology. (PALTEL Press Release, Subscription Free Internet SFI. Market Segments: Residential + Corporate at www.paltel.ps/retail-service11.cfm)

There are no subscription fees for the service as such, and the user does not have to go through a separate Internet Service Provider to connect to the Internet. Instead, those wishing to use SFI access the Internet by dialling a toll free telephone number and use an ISP number from a list supplied by PALTEL. However, once they access the Internet users will be charged a "tariff" on an hourly basis. Based on a survey of 739 households that have both a computer and a telephone, 428 responded to the interviews. The 2005 PCBS survey revealed the following:

1. 75.9% of those interviewed mentioned using SFI – 92.7% in rural areas and 54.8% in urban areas.
2. 70% stated that the SFI service encouraged them to use the Internet, and 56% rated the SFI project as very good, 33.4% as good, and only 19% said it was either satisfactory or unacceptable.
3. When asked to assess the cost of the new service, 36.7% said it was high, 48.7% fair, and 14.6% low. While 39.5% said that their costs decreased compared to previous reliance on ISP providers, 45.% reported no such decrease, and the remaining 14.7% were not sure. (PCBS Press Conference on the Survey Results: Assessment of Direct Internet Project – 2005, available through the PCBS at www.pcbs.org)

Internet Use

Turning our attention to the behavioural dimension of the Internet, the survey asked respondents 10 years of age and older to indicate if they (1) know about the Internet service and actually use it; (2) know about the service but do not use it; or (3) do not know about the service. Knowledge about and actual use of the Internet extends to around one-third (34%) of the sample; slightly more than one-third (37%) knew about the Internet but did not use it; and roughly one-fourth (27%) did not know about the Internet. Here again there are significant differences between males and females along regional lines, as shown in Tables 8 and 9. Close to 47 percent of males in Gaza know about the Internet service and use it, compared to 18.7 percent of females in Gaza. The corresponding figures for males and females in the West Bank are 37.9 percent and 26.2 percent, respectively. Of the males in the sample, 34.5 percent know about the service but do not use it, compared to 42.3 percent of the females. There are two further relevant observations to make. First, males in Gaza surpass their counterpart in the West Bank in terms of knowledge and use of the Internet. Females in Gaza emerge as the least likely users of the Internet (18.7%). But women in general who know about the Internet are less likely to use it than men. Second, the majority of the respondents either do not use the Internet, even though they know about it, or lack any familiarity with it. Lack of opportunity, especially for women and those who live in rural areas, and affordability are possible explanations for low usage rates.

Table 8
Internet Use by Gender and Region
(weighted)

	Male			Female		
Internet Use	West Bank	Gaza	Total	West Bank	Gaza	Total
Knows and Uses	37.9	46.9	510	26.1	18.7	230
Knows but Doesn't Use	35.8	31.7	432	42.5	41.8	410
Doesn't Know	26.3	21.4	310	31.3	39.6	330
Total	100.0%	100.0%		99.9%	100.1%	
N =	855	397	1252	654	316	970

Male: Chi-Square = 9.263 df = 2 p = .01
Female: Chi-Square = 9.272 df = 2 p = .10

Simultaneous breakdown of the data on Internet use by gender, region and locality produced the distribution in Table 10. The gender gap is narrowed somewhat in the case of urban males and females who know about and use the Internet (44% for males and 33% for females). However, living in rural areas lowers significantly the level of use and familiarity with the Internet.

Table 9
Internet Use by Gender and Region/Locality
(weighted sample)

Gender	Region/ Locality	Knows & Uses	Knows But Does Not Use	Doesn't Know	Total	N =
Males	West Bank, Urban	44.0	36.3	19.7	100.0%	532
	Gaza, Urban	46.2	32.4	21.5	100.1%	247
	West Bank, Rural	28.7	33.8	37.5	100.0%	275
	Gaza, Rural	8.3	58.3	33.3	99.9%	32
	Total	40.2	35.0	24.9	100.1%	1086
Females	West Bank, Urban	33.8	42.5	23.7	100.0%	426
	Gaza, Urban	15.9	43.8	40.3	100.0%	176
	West Bank, Rural	10.6	42.8	46.7	100.1%	180
	Gaza, Rural	14.3	21.4	64.3	100.0%	14
	Total	24.2	42.5	33.8	100.5%	796

Males: Chi-Square = 43.496 df = 6 p = .000
Females: Chi-Square = 65.201 df = 6 p = .000

There is no statistical difference between refugees and non-refugees regarding Internet use. Table 10 below shows a significant correlation between educational attainment of the head of the household and knowledge about and use of the Internet.

Table 10
Internet Use by Educational Background
(Weighted)

Education Level	Uses	Doesn't Use	Total	N =
Illiterate/Read & Write	3.8	96.2	100%	184
Primary	11.3	88.7	100%	467
Preparatory	30.0	70.0	100%	634
Secondary	47.8	52.2	100%	515
Post-Secondary	57.7	42.3	100%	423
Total	33.3	66.7	100%	2223

Chi-Square = 338.365 df = 4 p = .000

In Table 11, we control for gender, and discover that although as expected the gender differences noted earlier persist, completion of school beyond grade 9 (the preparatory stage) closes the gap somewhat between males and females. There are ten percentage points separating men from women who know of and use the Internet (55%:45%), and close to one half of the females know about the Internet (46%) but do not use it. Only 9 percent of those with high school education and beyond have not heard of the Internet. Overall, awareness of the Internet is fairly high among educated Palestinians, although economic and social circumstances play an inhibiting role in actual use of the Internet.

Table 11
Use of Internet by Gender and Education
(weighted)

Educational Level	Male				Female			
	Knows and Uses	Knows Doesn't Use	Doesn't Know	N =	Knows and Uses	Knows Doesn't Use	Doesn't Use	N =
Illiterate/Read & write	5.8%	36.5	57.7	104	1.3%	35.4	63.3	79
Primary	15.1%	33.1	51.8	261	7.0%	44.7	48.4	215
Preparatory	39.5%	42.1	18.3	349	18.2%	40.0	41.8	285
Secondary	55.2%	32.1	12.7	268	39.8%	43.1	17.1	246
Post-Secondary	64.1%	27.8	8.2	281	45.1%	45.8	9.2	142

Males: Chi-Square = 305.426 df = 8 p = .000
Females: Chi-Square = 186.462 df = 8 p = .000

The relationship among age, gender and use of the Internet is shown in Table 12. The data show that as age increases there is an increase in the proportion of those who know about the Internet and use it. But what is also clear is that between 35 and 45 percent know about the Internet but do not use it for one reason or another. Among those who are 20 years of age and older, only around 15 percent have not heard about the Internet.

Table 12
Internet Use by Age
(weighted sample)

Age (yrs.)	Knows & Uses Internet	Knows but Doesn't Use	Doesn't Know	Total	N =
10-19	22.5%	37.1	40.5	100.1%	1216
20-29	50.7%	35.8	13.6	100.1%	590
30-40	35.7%	48.4	15.9	100.0%	258
41+	48.4%	35.0	16.6	100.0%	157
N =	740	842	639		2221

Chi-Square = 244.675 df = 6 p = .000

If we collapse the responses to the question of Internet use into those who use the Internet and those who do not, we notice from Table 13 that the highest users of the Internet are the 20-29 year olds (59.8%) whereas among females it is the 41-year-olds and above (46.7%).

Chart IV
Internet Use by Age and Gender

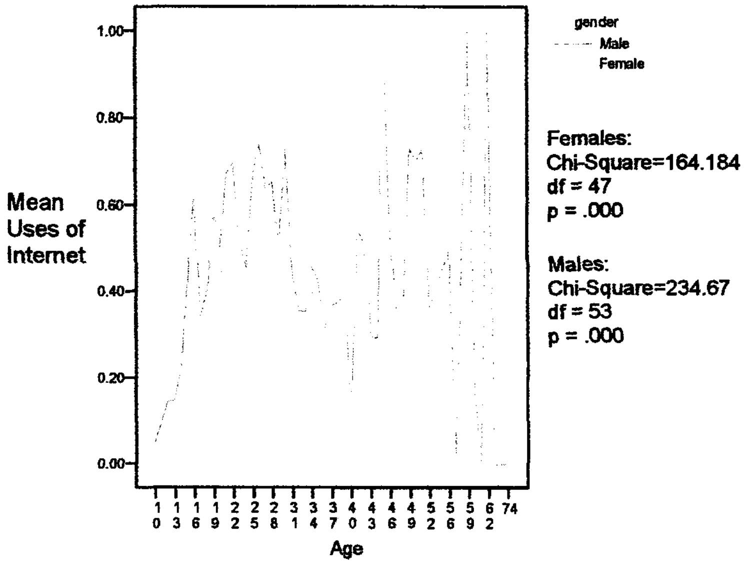


Table 13
Internet Use by Age and Gender
(weighted sample)

	Male		Female	
Age	Uses	Doesn't	Uses	Doesn't
10-19	29.3%	70.7	15.1%	84.9
20-29	59.8%	40.2	39.1%	60.9
30-40	40.2%	59.8	27.0%	73.0
41+	48.8%	51.2	46.7%	53.3
N =	510	742	229	739

Males: Chi-Square = 86.630 df = 3 p = .000
Females: Chi-Square = 67.350 df = 3 p = .000

Frequency of Internet Use

The survey attempted to establish a relationship between home availability of the Internet and frequency of Internet use in general. Of those who have Internet access at home, only one-quarter report never using the Internet (in the home and outside it), and the rest use it always (36.5%) or sometimes (38.8%). Three-quarters of those who do not have Internet access at home never use the Internet. Of those who do not have Internet at home, one-quarter use it nevertheless to one degree or another - presumably in places outside the home such as Internet cafes and community centres (see Table 14).

Table 14
Frequency of Internet Use
(weighted sample)

Frequency of Use	Household Has Internet	Household Doesn't	Don't Know	N =
Always	36.5%	6.1%	0.0%	270
Sometimes	38.8	19.9	14.3	527
Never	24.7	74.1	85.7	1444
Total	100.0%	100.1%	100.0%	-
N =	438	1796	7	2241

Chi-Square = 459.122 df = 4 p = .000

A breakdown of the data in Table 15 by gender, availability of the Internet at home, and frequency of usage shows that females are disadvantaged compared to males. Of the males who live in households with an Internet connection, only 20 percent report never using the Internet, whereas among females in homes with Internet 30.6 percent report never using the Internet. However, one-third of males in homes with no Internet connection nevertheless report using the Internet either always (7.9%) or sometimes (25.3%), whereas for females living in similar homes only on-fifth use the Internet either always (3.8%) or sometimes (18.2%). These differences are explained by the fact that to a certain extent it is easier in a traditional society for men than for women to spend time outside the home.

Table 15
Frequency of Internet Use by Gender
and Household Subscription to the Internet
(weighted sample)

Gender	Availability	Always	Sometimes	Never	Total	N =
Male	Yes	42.2%	37.6	20.3	100.1%	251
	No	7.9%	25.3	66.8	100.0%	999
	Total	14.7%	27.7	57.6	100.0%	
	N =	185	347	718		1250
Female	Yes	28.5%	40.9	30.6	100.0%	186
	No	3.8%	12.9	83.3	100.0%	796
	Total	8.4%	18.2	73.3	99.9%	
	N =	83	179	720		982

Males: Chi-Square = 245.645 df = 2 p = .000
Females: Chi-Square = 230.645 df = 2 p = .000

Use of Internet Outside the Home

As it is the case with third-world countries and those living in poor regions generally, the home is not the only site where users come in contact with the Internet. Internet cafes, youth clubs, and community centres provide important, and in some cases the only, venues for Internet use. The PCBS, in its 2003 Annual Report on Transport and Communications Statistics, lists 138 public access places that are equipped with 1512 computers and employ 180 people.* With regard to the 2004 survey which allowed for multiple answers to the question of place of usage, of those who use the Internet, 45.4 percent use it at home, 42.0 percent use it at Internet cafes, 30.1 per cent at friend's house, 25.1 percent at school, 22.8

* National Experience in the Collection and Dissemination of ICT Statistics, PCBS, available at http://www.escwa.org.lb/wsis/meetings/7-10june/32National_experience_ICT_ststsAbuharb.ppt#13

percent at work , and 5.0 percent in other places. Popularity of Internet cafes rises when respondents are asked to indicate the places where the Internet is used *most frequently*. As shown in Table 16, the home captures slightly more than one-third of the responses, followed by Internet cafes (30%), workplace (14.7%), school (8.6%), friend's house (6.7%), and other places (3.1%). Not surprisingly, more females (36%) than males (14%) use the Internet at home, while 64% of females and 86% of males access the Internet outside the home. There are no significant differences in the use of the Internet outside the home between rural and urban residents, between the West Bank and Gaza, and between refugees vs. non-refugees. However, since access to the Internet generally is linked to socio-economic factors, we discover that the two groups at the end of the socio-economic ladder to be the heaviest users of the Internet outside the home - though for different reasons. Thus 21.9 percent among professional and academic groups use the Internet outside the home, compared to 35 percent of blue collar workers. The former group is driven by need and affordability, while the latter by need.

Table 16
Location of Most Frequent Internet Use
(unweighted sample)

Place	
Home	37.6%
Internet Café	29.4
Work	14.7
School	8.6
Friend's House	6.7
Other Place	3.1
Total	100.1%
N =	654

According to the unweighted sample, Internet use is driven primarily by search for general information (27.7%), e-mail (16.1%), learning (15.6%), work (15.3%), entertainment (12.4%), chatting (12.4%), and other uses (0.7%). In terms of topics, Internet search is geared primarily to search for scientific information (32.9%), political topics (17.1%), chatting and SMS (14.8%), religious subjects (11.2%), computer upgrade (7.8%), women and family subjects (6.4%), health (5.5%), and other (4.3%).

Reasons for Not Using the Internet

A close-ended question, with multiple choice answers, was put to respondents regarding reasons for not using the Internet. As can be seen from Table 17, which is based on multiple answers, unavailability of the Internet service comes out on top, followed by lack of know-how, no need, cost, and lack of time. When we prorate the answers based on the sample size (i.e., number of respondents, rather than number of responses), we see from Table 18 that unavailability emerges as the most frequent reason (39.5%), followed by lack of know-how (24.6%), no need (19.3%), cost (8.1%), and no time (6.9%).

Table 17
Reasons for Not Using Internet
(unweighted sample)

Reason	Valid Percent	N =
Don't know how	47.9%	347
Service not available	70.4%	510
Expensive	39.6%	287
No time	22.8%	165
No need	43.5%	315
Other reason	1.5%	11

Table 18
Main Reason for Not Using Internet
(unweighted sample)

Reason	Valid Percent	N =
Service not available	39.5%	286
Don't know how	24.6	178
No need	19.3	140
Expensive	8.1	59
No Time	6.9	50
Other reason	1.5	11
Total	99.9%	724

When broken down by region and gender, and controlling for educational attainment on the basis of those who have lower than secondary schooling and those who have secondary schooling and beyond, we can see from Tables 15 and 16 in Appendix A that although the gender and educational gaps persist, regional differences play a role for the simple reason that Gaza is more impoverished than the West Bank. For example, substantially more of the Gaza respondents mentioned cost as an inhibiting factor. Among those with secondary education and above, more females (15.8%) and males (12.1%) from Gaza mentioned cost as a factor for not using the Internet compared to females (2.4%) and males (8.1%) from the West Bank. More than one-half (53.9%) of the males in Gaza with education below the secondary level mentioned lack of know-how as a factor, compared to their male (15.9%) counterpart in the West Bank. A confirmation that cost is not viewed as major expense emerges from another question which asked Internet subscribers to express their views about Internet cost. Less than one in ten said it is too high, one quarter said it is high, while 60% said it is "suitable".

Recall from the focus group interviews that while moral concerns were expressed regarding unsupervised use of the Internet by young people, on the whole the groups did not feel that control by parents or by older siblings (brothers in particular) was widespread or constituted a hindrance to using the Internet. Bearing in mind that participants in the focus groups were educated and knowledgeable about and used the Internet, it is legitimate to inquire if this assessment prevailed in the national sample. Close to two-thirds of households in the national sample with Internet subscription reported that the home controls to varying degrees the websites visited by Internet users, as shown in Table 19, a finding that contradicts the picture portrayed by the focus groups.

Table 19
Extent of Controlling Website Visits
(unweighted sample)

Control	Households with Internet
Yes, always	47.2%
Yes, sometimes	20.2
No	32.6
Total	100.0%
N =	580

Cost of Using the Internet

Although not a major deterrent for using the Internet, cost inequity is reflected in regional and other demographic comparisons. To examine the issue, the survey asked respondents to indicate if they incurred paying fees for using the Internet outside the home. In addition to analyzing the correlates of outside Internet access, we went beyond this and constructed a monthly combined expense amount for accessing the Internet that included telephone charges, Internet service provider bills, and outside payments for accessing the Internet.

Table 20
Payment for Internet Outside the Home
By Availability of Telephone at Home
(weighted sample)

	Telephone Line		
Outside Payment	Yes	No	N =
Yes	32.7%	63.4%	810
No	67.3	36.6	202
Total	100.0%	100.0%	
N =	619	393	1012

Chi-Square = 63.94 df = 1 p = .000

With regard to the first aspect, it is shown that substantially fewer (32.7%) of those who own telephone pay for outside use of the Internet compared to those who do not have telephone service at home (63.4%) – not an unexpected finding (see Table 20). By a margin of 2.5 to 1 more males than females (48.7%:16.5%) incur outside costs for using the Internet (see Table 21), pointing to the advantaged economic position of males in Palestinian society.

Table 21
Payment for Internet Use Outside the Home
By Gender
(weighted)

Outside Payment	Male	Female	N =
Yes	50.2%	20.3%	629
No	49.9	79.7	384
Total	100.0%	100.0%	
N =	620	383	1013

Chi-Square = 88.977 df = 1 p = .000

Compared to the West Bank, more Gaza users spend money to access the Internet outside the home (42.3%:37.1%), while camp refugees spend more than non-camp refugees (51.1%: 35.4%). There were no statistically significant differences in incurring expenses outside the home for using the Internet for the following groups: rural vs. urban, and refugee vs. non-refugee (se Tables . However, as can be seen from Tables 22 and 23, there were statistically significant correlations between each of educational and occupational background, on the one hand, and Internet expenses incurred outside the home, on the other. With regard to education, those with preparatory education and less spend substantially less on Internet expenses outside the home. Occupational background shows clearly that those with lesser means, such as office workers, blue collar workers, service and sales employees, pay proportionately more for Internet use outside the home.

Table 22
Pays for Using Internet Outside the Home
By Educational Background
(weighted)

Educational Background	Pays	Doesn't Pay	Total	N =
Illiterate/Reads & Writes	8.3%	91.7	100.0%	48
Primary	22.2%	77.8	100.0%	108
Preparatory	55.3%	44.7	100.0%	235
Secondary	41.5%	58.5	100.0%	313
Post-Secondary	34.2%	65.8	100.0%	307
All	38.9%	61.1	100.0%	1011

Chi-Square = 61.94 df = 4 p = .000

Table 23
Pays for Using Internet Outside the Home
By Occupation
(weighted)

Occupation	Pays	Doesn't Pay	Total	N =
Admin/Manager	22.0%	78.0	100.0%	41
Academic/Professional	28.5%	71.5	100.0%	137
Technical	29.4%	70.6	100.0%	51
Office Worker	43.8%	56.3	100.0%	16
Service/Sales	51.1%	48.9	100.0%	45
Agriculture	66.7%	33.3	100.0%	3
Blue Collar	35.3%	64.7	100.0%	34
Machine Operator	28.6%	71.4	100.0%	21
Vendor/Unskilled	53.1%	46.9	100.0%	32
N =	250	130		380

Chi-Square = 18.430 df = 8 p = .018

In an attempt to capture the average combined cost of using the Internet on a monthly basis, we present in summary Table 24 the means categorized according to the background variables, and availability of telephone at home. Here we see that West Bank residents spend nearly twice as much as Gaza residents on using the Internet, and urban regions spend slightly more than rural ones, although the difference between urban and regional spending is not statistically significant. However, if we examine the percentile distributions in Table 25 and visually inspect the boxplots presented in Appendix B, we notice that the spending distribution of rural people is much more stretched above the median than below it, so that a mean of 100 New Israeli Shekels considerably exceeds the median of 57.5 New Israeli Shekels. The same holds for urban residents but the skewness of the distribution is not so pronounced. As well, the IQR (widths of the boxes) tell us that the spending of rural people tends to be closer to its median, relative to urban residents. Al in all, quite few people in both localities fall in the outliers. The same procedure can be applied to assess the remaining distributions (see boxplots for the weighted and unweighted samples in Appendix B).

The partitioned variables along region and locality present us with interesting findings. While urban West Bank emerges as the place with the highest level of combined spending on the Internet, followed by rural West Bank, rural Gaza is not far behind, although it is substantially ahead of urban Gaza. Gaza, generally an impoverished region, nevertheless incurs in relative terms substantial expense for using the Internet. There are statistically significant differences between urban West Bank and urban Gaza, but not between rural West Bank and rural Gaza. It is clear from Table 24 that owning a phone, although convenient and allows more frequent Internet access, increases the combined cost by three times compared to those who do not own a phone and who use the Internet in clubs, community centres, and Internet cafes. On average West Bankers spend around $30 (Canadian) per month (125.42 New Israeli Shekels) for accessing the Internet from home (i.e., phone service, an Internet Service Provider, and Internet use outside the home), while rural West Bankers spend slightly above $20 (Canadian) per month. Chart V presents the full range of combined Internet spending for the region/locality variable.

Table 24
Average Combined Monthly Expenses for the Internet
by Background Variables
(unweighted sample)

Background	Avg. in New Israeli Shekels	t-tests
Region		
West Bank	125.42	F=88.147
Gaza	68.53	Sig.=0.000
Locality		
Urban	113.45	F=208
Rural	100.53	Sig.=.649
Region/Locality		
West Bank, Urban	133.18	F=50.06
Gaza, Urban	72.91	Sig.=.000
West Bank, Rural	101.09	F=1.563
Gaza, Rural	92.89	Sig.=.213
Availability of Telephone at Home		
Yes	123.34	F=57.323
No	40.65	Sig.=.000

Chart V
Combined Cost of Internet by Region and Locality

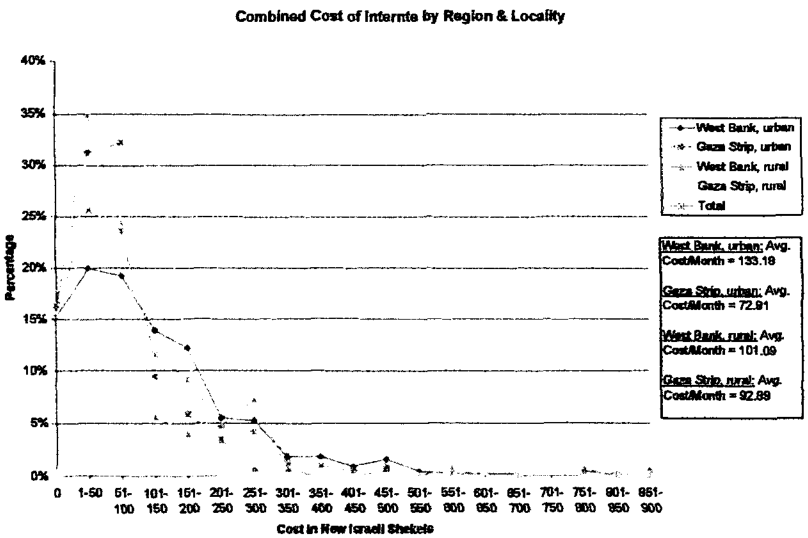


Table 25
Percentile Distribution of Combined Internet Spending*
By Background Variables and Telephone Ownership
(unweighted sample)

Background Variable	Percentile						
	5	10	25	50	75	90	95
Locality							
Urban	0.00	0.00	20.00	80.00	150.00	250.00	350.00
Rural	0.00	0.00	20.00	57.00	110.25	252.80	300.00
Region							
West Bank	0.00	0.00	24.00	100.00	100.00	300.00	440.00
Gaza	0.00	0.00	20.00	50.00	100.00	150.00	200.00
Region/Locality							
West Bank, Urban	0.00	0.00	30.00	100.00	200.00	300.00	410.00
Gaza, Urban	0.00	0.00	20.00	50.00	100.00	167.00	217.00
West Bank, Rural	0.00	0.00	20.00	50.00	100.00	276.361	300.00
Gaza, Rural	6.00	6.00	40.00	100.00	135.00	--	--
Refugee Status							
Refugee	0.00	0.00	20.00	60.00	114.55	201.97	300.00
Non-Refugee	0.00	0.00	30.00	100.00	180.00	300.00	430.00
Telephone Ownership							
Yes	0.00	0.00	40.00	100.00	160.00	280.00	350.00
No	0.00	0.00	0.00	20.00	50.00	100.00	150.00

* New Israeli Shekels

Computer Ownership and Use

Computer Ownership

We remarked earlier that ownership of personal computers extends to around 30 percent of the sample. There are significant differences between the West Bank (31.5%) and Gaza (25.4%), and between urban (34.3%) and rural localities (19.5%), and slight differences between camp refugees (26.9%) and non-camp refugees (30.7%) (see Tables 17 and 18 in Appendix A).

As well, there are differences among cities. For example, 45 percent of those living in East Jerusalem owned computers, close to 30 percent of those who live in the West Bank city of Qalqiliya, 27 percent of Ramallah, and of the rest, except for the last three towns at the lower end of Chart VI, 20 percent of the population own computers. The most pronounced difference appears when we partition the data along region and locality as shown in Table 26 below. Gaza, the most impoverished area of Palestine, has 10.9 percent computer ownership levels, whereas 20 percent of rural West Bankers own computers, 24.8 percent for urban Gaza, and 40.2 percent for urban West Bank.

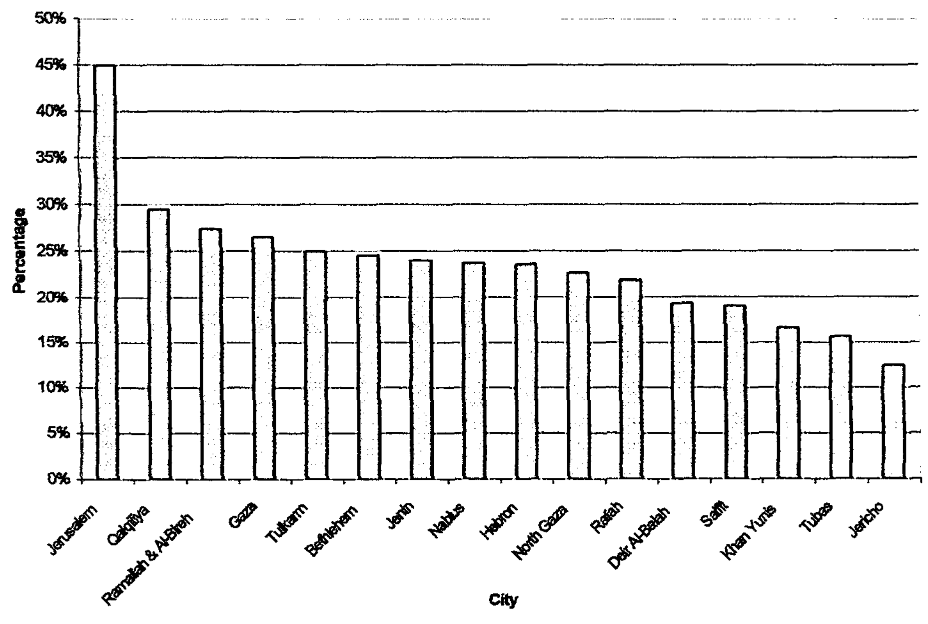
Table 26
Computer Ownership by Region/Locality
(Weighted)

Region/Locality	Ownership		Total	N =
	Yes	No		
West Bank, Urban	40.2%	59.8	100%	2245
Gaza, Urban	24.8%	75.2	100%	1394
West Bank, Rural	20.2%	79.8	100%	1502
Gaza, Rural	10.9%	89.1	100%	119
Total	29.8%	70.2	100%	5260

Chi-Square = 220.105 df = 3 p = .000

Not unexpectedly, computer ownership is correlated with educational attainment and occupation. Tables 19 and 20 in Appendix A show that with regard to education around 50 percent of those with post-secondary education have at least one computer in the household, compared to 33 percent of those with full or some secondary education. The percentage drops to 20 percent for those with primary schooling only. Similarly, ownership of computers among professional and white-collar groups extends from nearly 40 to 50 percent.

Chart VI
Computer Ownership by City
(weighted sample)



Computer Use

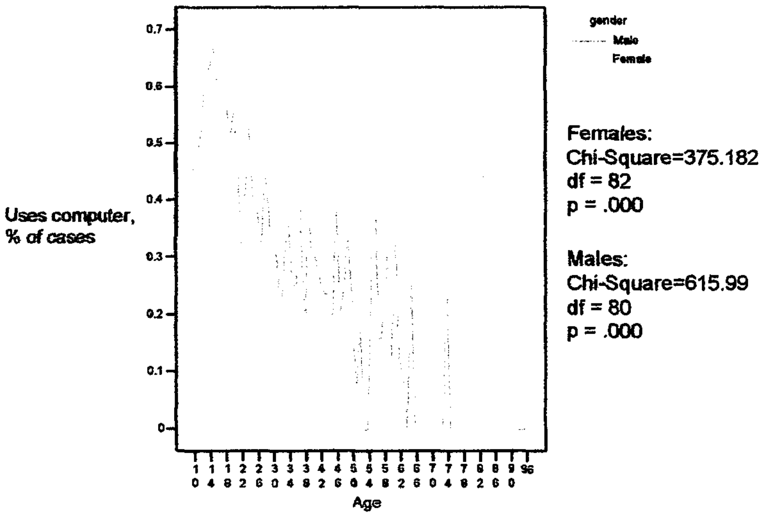
Questions related to computer use were of four types: first, to document who uses computers in terms of age, gender, region and locality; second, where people use computers; third, the purpose for which computers are used; and fourth, the reasons why people do not use computers. Table 27 shows that males (39.8%) surpass females (31.5%) in computer use, although at somewhat narrower gap than that shown for gender differences regarding Internet use. When viewed in terms of age and gender, Chart VII shows that up to the age of 18 (i.e., the end of high school) there is an overlap in computer use between males and females. The gap begins to widen from the age of 20 onwards, particularly during entry in the labour force where women have substantially lower participation rates compared to men. Overall, up to the age of 30, the gap is narrower between males and females in contrast to older generations.

Table 27
Computer Use by Gender
(weighted)

Use	Male	Female	All
Yes	39.8%	31.5%	35.7%
No	60.2	68.5	64.5
Total	100%	100%	100%
N=	3146	3081	6227

Chi-Square = 46.87 df = 1 p = .000

Chart VII
Computer Use by Age and Gender
(weighted sample)



When we classify computer use by gender, region, and locality, we get the distribution displayed in Table 28. The differences between males and females remain, but the locale/region split shows that rural Gaza has a "levelling" effect on the gender gap, with 21.3 percent of the males report using computers compared to 24.6 percent of the females. As expected, there is a correlation between socio-economic background, such as occupation and education, on the one hand, and computer use on the other. For example, white-collar workers generally use computers more often than the rest of the occupational groups. Whereas between 10 and 30 percent of those in the service, agricultural, manual, and unskilled occupations use computers, the proportion reaches three-quarters among office workers and professional groups (see Table 21 in Appendix A). When controlling for gender and examining the relationship between education and computer use, we notice from Table 22 in Appendix A that the gender divide is most apparent at the two extremes of the educational continuum. At the lower end, more of the males (21.5%) with less than primary education use computers compared to females with similar educational levels. Likewise, 70.4 percent of the males with post-secondary education use computer, compared to 57.9 percent of the females.

Table 28
Computer Use by Gender, Region, and Locality
(weighted)

		Uses	Doesn't Use	Total	N =
Male	West Bank, Urban	47.0%	53.0	100.0%	1131
	Gaza, Urban	34.7%	63.3	100.0%	709
	West Bank, Rural	36.4%	63.6	100.0%	755
	Gaza, Rural	21.3%	78.7	100.0%	61
Female	West Bank, Urban	38.3%	61.7	100.0%	1113
	Gaza, Urban	25.5%	74.5	100.0%	665
	West Bank, Rural	24.1%	75.9	100.0%	748
	Gaza, Rural	24.6%	75.4	100.0%	57

Males: Chi-Square = 44.481 df = 3 p = .000
Females: Chi-Square = 55.186 df = 3 p = .000

While computer use is more widespread than Internet use, Table 28 shows that entertainment (40.5%) emerges as the main reason for using the computer, followed by study (32.1%), work (9.3%), Internet (7.4%), and email (3.5%). As shown in Table 30, the main reasons for not using computers are lack of know-how (60.9%), followed by cost (21.7%), and no need (13.7%). In light of these findings, it is not surprising to discover that only one-fifth of computer users took computer training courses (see Appendix A Table 23).

Table 29
Users' Main Reasons for Using Computer
(weighted sample)

Reasons	Percent
Entertainment	40.5%
Learning/Studying	32.1
Work	9.3
Internet	7.4
E-mail	3.5
Window's Applications	7.0
Other	0.3
Total	100.1%
N =	2222

In contrast to the reasons given by users, heads of households gave the following reasons for owning a computer: teaching adults (30.2%), teaching children (27.6%), work (11.5%), entertainment for children (10.8%), skill development (9.1%), e-mail (5.7%), and entertainment for adults (5.1%). It is shown in Table 31 that the home is the main location of computer use (47.0%), followed by school (21.7%), Internet cafes (9.1%), work (8.4%), and friend's home (7.6%).

Table 30
Main Reasons for Not Using Computer
(weighted sample)

Reasons	Percent
Don't know how	60.9%
Expensive	21.7
No need	13.7
Waste of time	2.3
Harmful to health	0.3
Other	1.2
Total	100.0%
N =	4005

Table 31
Location of Most Frequent Computer Use
(weighted sample)

Location	Percent
Home	47.0%
School	21.7
Internet Café	9.1
Work	8.4
Friend's Home	7.6
Sports/Cultural Club	1.2
Youth Social Centre	0.8
Other	4.2
Total	100.0%
N =	2222

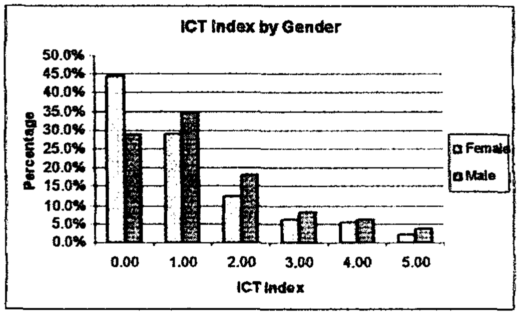
ICT Index

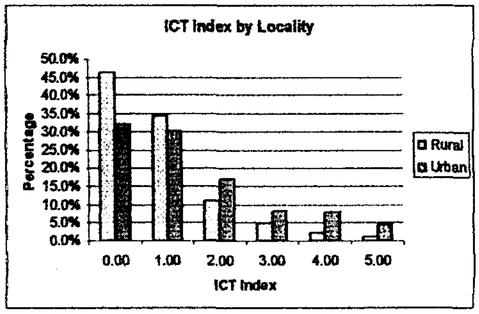
In order to study the correlates of ICT indicators cumulatively, we established an ICT index based on ownership of five basic items: telephones, cell phones, computers, printers, and Internet subscription. A respondent/household gets one point for each item owned, up to a score of five. The sample distribution for the Index is displayed in Table 32, which shows that slightly more than one-third of the sample owned none of the ICT indicators, one-third owned one item, and a meagre 2.7% owned five items.

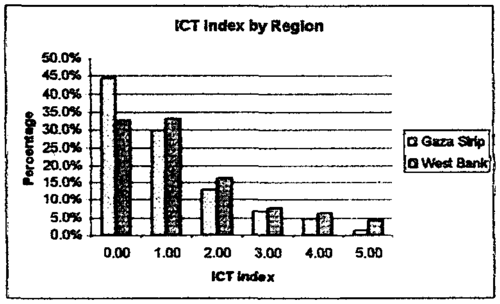
Table 32
Distribution of ICT Index
(weighted sample)

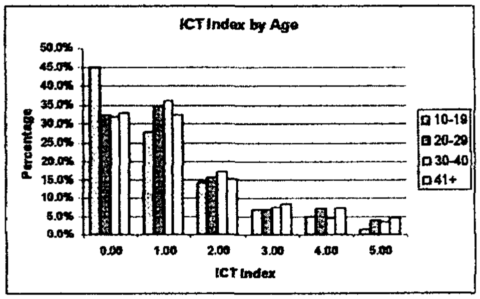
	ICT Index						Total
	Low					High	
	0.00	1.00	2.00	3.00	4.00	5.00	
Frequency	2386	2072	876	414	312	167	6227
Percent	38.3	33.3	14.1	6.6	5.0	2.7	100.0
Valid Percent	38.3	33.3	14.1	6.6	5.0	2.7	100.0

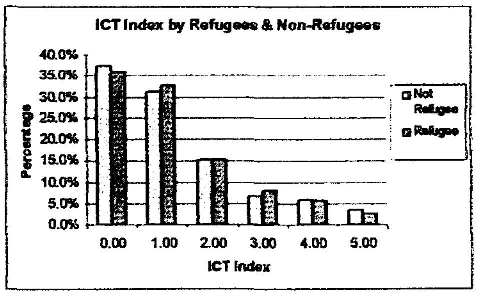
Instead of presenting individual cross tabulation between each of the background variables and the ICT index, we present below a series of bar charts for the familiar background variables at the household level (gender, age, refugee status, level of education, locality, region, and occupation). Tabular findings are available in Appendix A. The findings confirm the picture portrayed so far regarding each of the ICT indicators along the lines of gender, locality and region, education and occupation. There was no clear association between refugee status and ownership of ICT. Education correlated in the expected direction by showing higher scores on the ICT index among respondents with secondary and post-secondary education, compared to those with preparatory education and lower. Occupational background showed the professional, administrative and technical groups to be better endowed compared to office workers, agricultural and blue collar workers, machine operators, and vendors/unskilled workers. Likewise, the same was true of region and gender. The ICT index for the West Bank was higher than Gaza's, and higher for males than for females.

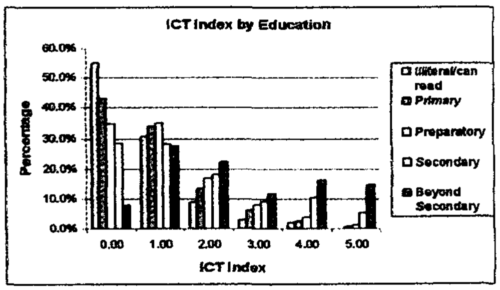


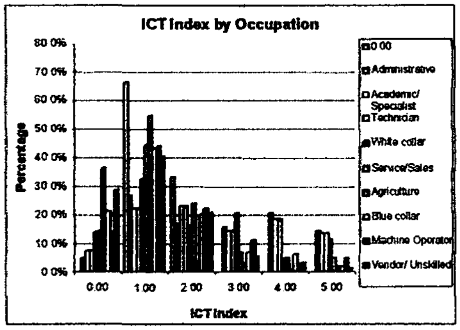






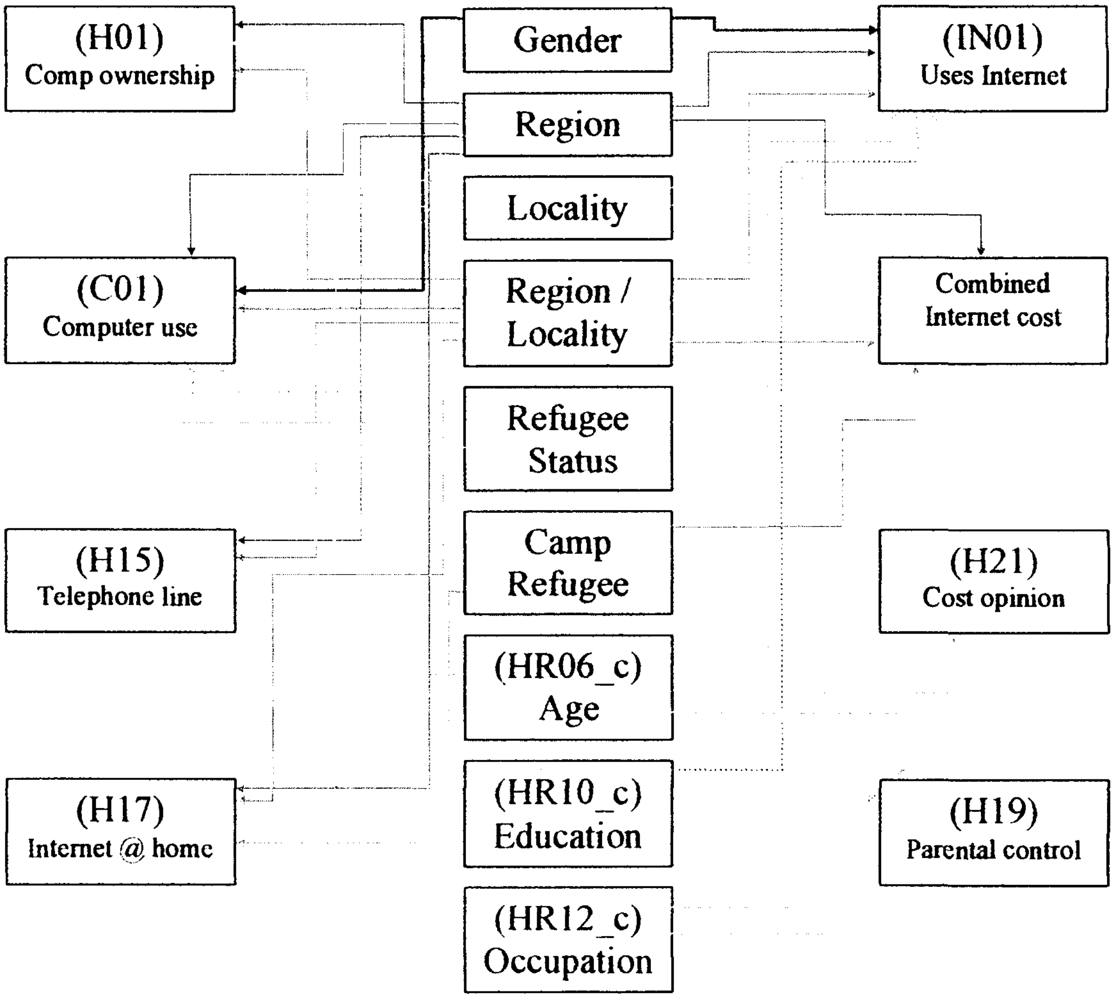






Logistic Regression

The General Model
95% - Significant Relationships with Background Variables
(weighted sample)



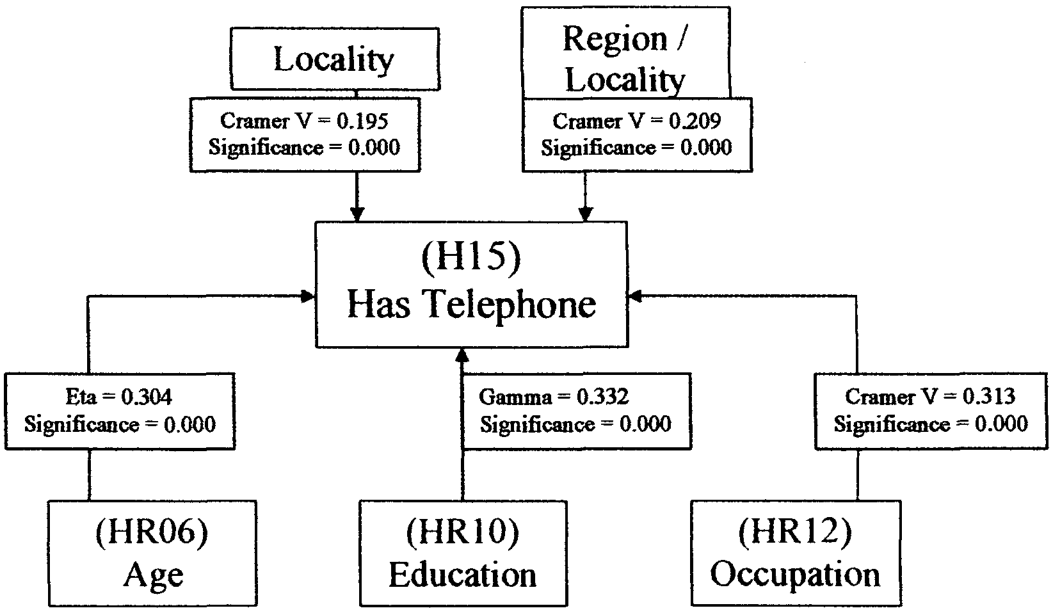
In order to get a more comprehensive picture of the relative contributions of several independent variables to key ICT indicators, we employed, where applicable, logistic regression models on the following dichotomous dependent variables: telephone ownership, cell phone ownership, Internet subscription, use of Internet cafés, computer ownership, and computer use. The diagram below depicts the significant relationships between background variables and a series of dependent variables each of which will be treated separately in subsequent logistic regression models.

We present below four logistic regression models dealing with the determinants of (1) telephone ownership, (2) Internet subscription, (3) use of Internet cafés, and (4) ownership of computers. Models 1, 2, and 4 rely on head-of-household data, while model 3 uses individual respondents who are 10 years of age and above. We provide detailed commentary in the first regression model regarding telephone ownership. The remaining three models use the same logic and are presented in this chapter in summary form showing basically the correlations in the general model and the odds ratios for the final model, leaving the details of the models to be included in Appendix B.

Telephone Ownership

Based on the cluster of relationships depicted in the general model of ICT indicators, we entered in the analysis of the regression model for telephone ownership the following independent variables which had significant correlation with the dependent variable: age (collapsed), education (collapsed), occupation (collapsed), and locality (urban vs. rural). In order to overcome the effect of skewed frequency distribution, the age variable was divided into quartiles. The reference category was those above 50 years of age. It can be seen from the table that the odds ratio in owning a telephone at home for those in the 10-30 year-old group is nearly one-tenth (.108) of the 51 year-old reference group.

Telephone Line (heads of household only)
95%-significance relationships
(weighted model)



Similarly, those with preparatory (.451) and secondary education have almost half (.444) the odds ratio in owning a phone compared to those who have post-secondary education. For households which are headed by someone who has primary education the odds ratio that the household will have a phone at home is nearly one-third (.321) of a household that is headed by someone with post-secondary education. By using the unskilled workers as the occupational reference group, we can see from the table that being in the administrative/managerial group has an odds ratio of 5.5 in owning a telephone.

Regression Model
Has telephone line (H15) Variable Encoding

Original Value	Model Value
No	0
Yes	1

Categorical Variables Coding

		Frequency	Parameter coding							
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(HR12_c) Occupation (collapsed)	Administrative	67	0.889	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
	Academic/Specialist	143	-0.111	0.889	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
	Technician	90	-0.111	-0.111	0.889	-0.111	-0.111	-0.111	-0.111	-0.111
	White collar	22	-0.111	-0.111	-0.111	0.889	-0.111	-0.111	-0.111	-0.111
	Service/Sales	223	-0.111	-0.111	-0.111	-0.111	0.889	-0.111	-0.111	-0.111
	Agriculture	89	-0.111	-0.111	-0.111	-0.111	-0.111	0.889	-0.111	-0.111
	Blue collar	271	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	0.889	-0.111
	Machine operator	107	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	0.889
	Vendor/Unskilled	343	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
Education (collapsed)	Illiteral/can read	133	0.8	-0.2	-0.2	-0.2				
	Primary	300	-0.2	0.8	-0.2	-0.2				
	Preparatory	377	-0.2	-0.2	0.8	-0.2				
	Secondary	272	-0.2	-0.2	-0.2	0.8				
	Beyond Secondary	273	-0.2	-0.2	-0.2	-0.2				
Age (collapsed)	10-30	415	0.75	-0.25	-0.25					
	31-37	389	-0.25	0.75	-0.25					
	38-50	368	-0.25	-0.25	0.75					
	51+	183	-0.25	-0.25	-0.25					
Locality	Rural	463	0							
	Urban	892	1							

Fitted model

	Coefficient	Odds Ratio
Constant	-0.914	
Age: 10-30	-2.223	0.108
Age: 31-37	-1.758	0.172
Age: 38-50	-1.178	0.308
Education: illiteral/can read	-1.940	0.144
Education: primary	-1.157	0.314
Education: preparatory	-0.795	0.451
Education: secondary	-0.811	0.444
Occupation: Administrative	1.707	5.513
Occupation: Academic/Specialist	0.712	2.038
Occupation: Technician	0.976	2.653
Occupation: White collar	0.553	1.738
Occupation: Service/Sales	0.319	1.376
Occupation: Agriculture	-0.814	0.443
Occupation: Blue collar	0.610	1.840
Occupation: Machine operator	0.456	1.578
Locality: Urban	0.889	2.432

Hosmer-Lemeshov significance = 0.299

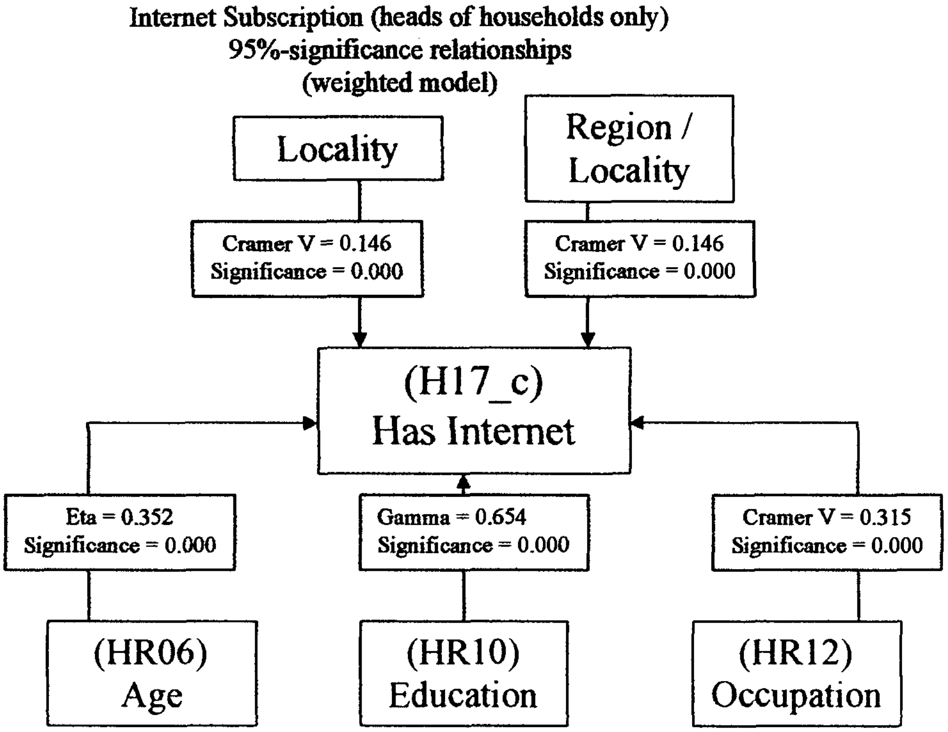
Nagelkerke R-square: 0.651

Classification threshold: 0.42
Correct classification: 69.1%

Finally, when considering the locality as an independent variable, those households in urban areas have 2.43 odds ratio in owning a phone compared to people residing in rural areas. Altogether, the model classified correctly 69.1 percent of the cases showing the dependent variable to be correctly predicted in its "Yes" and "No" values. This percentage of correct classification is obtained based on the assumption that both "Yes" and "No" categories are equally important and we are interested in equal risk of misclassifying a case.

The remaining three models of Internet subscription, Internet café use, and computer ownership are presented below in abbreviated fashion. By inspecting the odds ratios in each model, the reader can deduce the relative contribution of the independent variables.

Internet Subscription



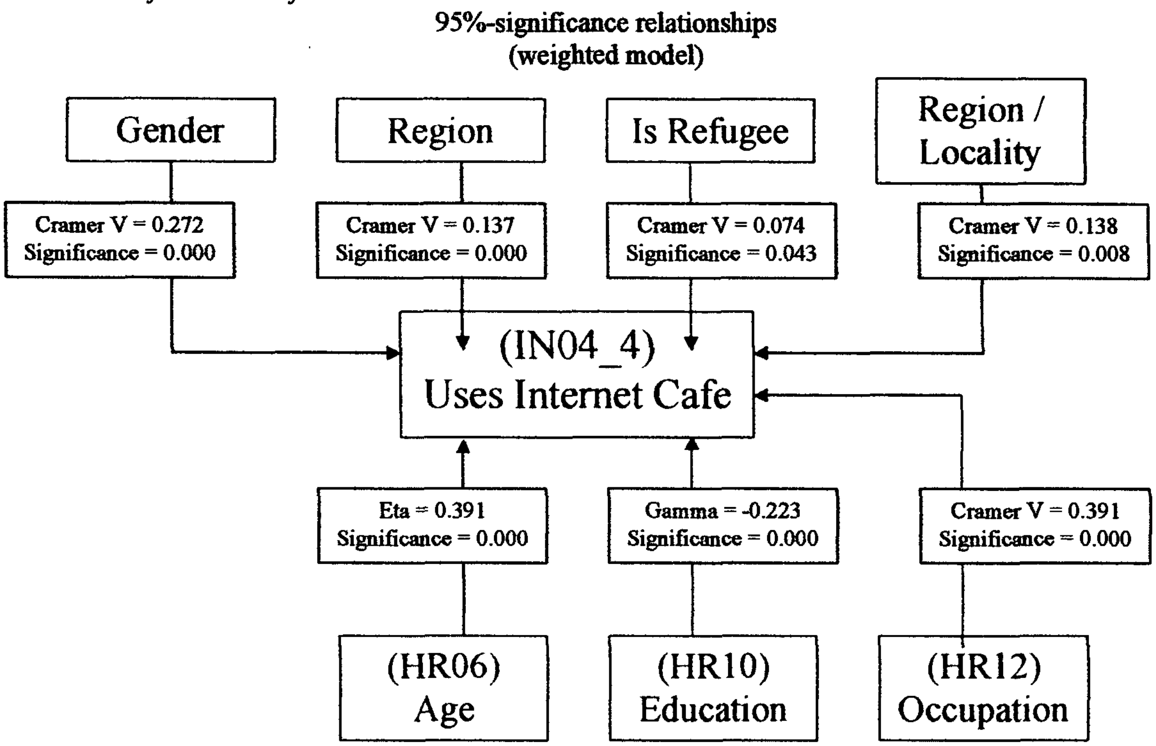
	Coefficient	Odds Ratio
Constant	-3.474	0.031
Age: 10-30	-1.412	0.244
Age: 31-37	-1.701	0.182
Age: 38-50	-0.403	0.668
Education: illiterate/can read	-2.305	0.100
Education: primary	-2.367	0.094
Education: preparatory	-2.424	0.089
Education: secondary	-1.611	0.200
Locality: Urban	1.196	3.306
Occupation: Administrative	1.386	3.999
Occupation: Academic/Specialist	0.570	1.768
Occupation: Technician	-0.005	0.995
Occupation: White Collar	0.604	1.830
Occupation: Service/Sales	0.104	1.109
Occupation: Agriculture	-0.188	0.829
Occupation: Blue Collar	0.332	1.394
Occupation: Machine Operator	0.547	1.728

Hosmer-Lemeshov significance = 0.354

Nagelkerke R-square: 0.338

Classification threshold: 0.11
Correct classification: 76.5%

Use of Internet Cafés



Fitted Model

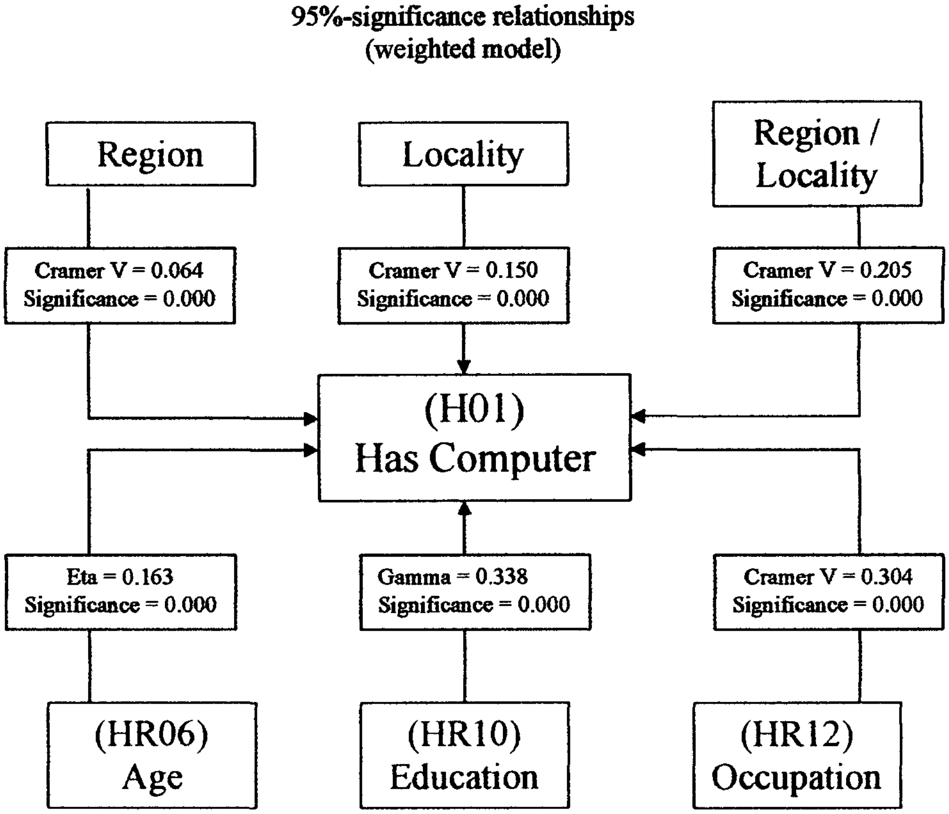
	Coefficient	Odds Ratio
Constant	-1.698	0.183
Gender: Male	1.463	4.321
Region: Gaza	0.633	1.884
Age: 10-19	2.582	13.219
Age: 20-29	2.334	10.319
Age: 30-40	1.133	3.106

Hosmer-Lemeshov
significance = 0.060

Nagelkerke R-square: 0.246

Classification threshold: 0.5
Correct classification: 69.6%

Computer Ownership



Fitted Model

	Coefficient	Odds Ratio
Constant	-1.186	0.305
Age: 10-19	-0.514	0.598
Age: 20-29	-1.280	0.278
Age: 30-40	-1.155	0.315
Education: illiterate/can read	-2.240	0.106
Education: primary	-1.890	0.151
Education: preparatory	-1.094	0.335
Education: secondary	-0.681	0.506
Occupation: Administrative	0.910	2.484
Occupation: Academic/Specialist	0.410	1.506
Occupation: Technician	0.273	1.313
Occupation: White Collar	0.580	1.786
Occupation: Service/Sales	0.195	1.215
Occupation: Agriculture	-0.653	0.521
Occupation: Blue Collar	0.161	1.175
Occupation: Machine Operator	-0.003	0.997
Region/Locality: West Bank, urban	0.983	2.673
Region/Locality: Gaza Strip, urban	0.022	1.022
Region/Locality: West Bank, rural	0.185	1.203

Hosmer-Lemeshov significance = 0.086

Nagelkerke R-square: 0.275

Classification threshold: 0.33
Correct classification: 71.8%

Conclusion

Although the statistical picture of ICT in Palestine presented in this chapter is multifaceted and complex, it is possible to discern its main features. First, although members of an emerging third world country, Palestinians are increasingly orienting themselves to using computers and the Internet. In the last decade, particularly since 1999 with the establishment of a national telecommunications carrier, Internet subscriptions have doubled. Admittedly, regionally and by international standards as provided by the International Telecommunications Union (ITU) and other sources Palestine ranks fairly low in the provision of basic infrastructural services and human capital trained in ICT skills. This is significant, bearing in mind the rather high cost of Internet subscription in the midst of poverty that extends to almost 50 percent of the Palestinian population according to a recent report by the World Bank.*

Second, although there were important regional differences in the use of the computer and the Internet – differences that reflect the political economy of the Palestinian territories and dependence on Israel – from the human capital perspective gender differences stood out as the most significant factor. A multiplying effect was at play here. Because of the

* World Bank. *Four Years – Intifada, Closures and Palestinian Economic Crisis: An Assessment.* October 2004. Available at <http://siteresources.worldbank.org/INTWESTBANKGAZA/Resources/wbgaza-4yrassessment.pdf>.

traditional nature of Palestinian society and male dominance, geographic mobility and participation rates of females in the labour force remained fairly low. Females do not possess anywhere near the same level of economic power as males, hence the disparity in the use of the Internet and access to ICT indicators. The gender divide appears to be taking hold as early as the teen years, even though the educational attainment of young females is not far behind males at this stage. This is particularly true with regard to the Internet and less so in the case of computer use where female rates are close to males'. Lack of opportunity for females is aptly demonstrated when we examine the proportion of females who say they know about the Internet but do not use it. This is particularly the case with females who have secondary education and beyond. Among females with post-secondary education, 45 percent indicate that they know about the Internet but do not use it, compared to 28 percent of the males.

Third, in spite of the economic deprivation mentioned above, cost is not perceived as the main reason for not using the Internet. Rather, lack of know-how and availability of Internet (presumably for those who want to use the Internet outside their homes but cannot) are cited as the main reasons. Less than 10 percent of the sample mentioned cost explicitly as an inhibitor of Internet use.

Fourth, education and occupational background, two main socio-economic indicators, correlate significantly with ICT in the expected direction. The higher the educational and occupational background of the respondent, the more likely it is that that he or she will use computers and the Internet. This was also true with regard to the ICT index which encompassed five ICT indicators.

Fifth, close to one-third of the sample gave Internet cafés and friends' houses as places where they primarily access the Internet. Very few mentioned the school as a place where the Internet is used. In the absence of universal access to the Internet, the recent experiment of PALTEL notwithstanding, it behoves Palestinian makers to facilitate wider access to Internet cafés and other public places that are equipped with Internet.

Finally, with regard to cost we discovered by using the t-test that there are no significant differences in statistical means for urban and rural areas. However, as we saw in the percentiles table above and visually in the boxplot in Appendix B, the rural median is slightly lower than the median for urban areas. The groupings by region reveal a significant difference in means, with people in Gaza spending, on average, 57 New Israeli Shekels less than in the West Bank. In the rural locality, the difference in means for Gaza and West Bank is not significant.

Appendices

Appendix A

Table 1
Availability of Telephone by Occupation
(unweighted sample)

Occupation	Have Telephone	Don't Have	Total	N =
Administrative/Managerial	64.9%	35.1	100.0%	77
Academic/Professional	67.2%	32.8	100.0%	177
Technician	54.6%	45.4	100.0%	119
Office Employees	41.4%	58.6	100.0%	29
Service/Sales	33.5%	66.5	100.0%	278
Agriculture	17.7%	82.3	100.0%	96
Blue Collar	34.7%	65.3	100.0%	311
Machine Operator	33.9%	66.1	100.0%	121
Vendor/Unskilled	22.9%	77.1	100.0%	406
Total	37.1%	62.9	100.0%	1614

Chi-Square = 163.8 df = 8 p = .000

Table 2
Availability of Telephone by Education
(unweighted sample)

Education	Have Telephone	Don't Have	Total	N =
Illiterate/Read & Write	22.8%	77.2	100.0%	162
Primary	28.2%	71.8	100.0%	341
Preparatory	29.1%	70.9	100.0%	454
Secondary	37.0%	63.0	100.0%	316
Post-Secondary	63.3%	36.7	100.0%	341
Total	37.1%	62.9	100.0%	1614

Chi-Square = 130.058 df = 4 p = .000

Table 3
Ownership of Cell Phones by Gender
(unweighted sample)

Ownership	Male	Female	N =
Yes	48.9%	17.2%	3249
No	51.1	82.8	2978
Total	100%	100%	
N =	4211	2016	6227

Chi-Square = 714.082 df = 1 p = .000

Table 4
Ownership of Cell Phones by Locality
(unweighted sample)

Ownership	Urban	Rural	N =
Yes	34.6%	30.1%	1782
No	65.4	69.9	3452
Total	100%	100%	
N =	3504	1730	5234

Chi-Square = 10.400 df = 1 p = .001

Table 5
Ownership of Cell Phones by Region
(unweighted sample)

Ownership	West Bank	Gaza	N =
Yes	37.0%	24.5%	2307
No	63.0	75.5	3920
Total	100%	100%	
N =	4211	2016	6227

Chi-Square = 104.056 df = 1 p = .000

Table 6
Ownership of Cell Phones by Region/Locality
(unweighted sample)

Region/Locality	Ownership		Total	N =
	Yes	No		
West Bank, Urban	41.8%	58.2	100%	2037
Gaza, Urban	24.1%	75.9	100%	1415
West Bank, Rural	31.1%	68.9	100%	1611
Gaza, Rural	21.1%	78.9	100%	171

Table 7
Ownership of Cell Phones
by Refugee Status
(unweighted sample)

Ownership	Refugee	Non-Refugee
Yes	30.9%	33.5%
No	69.1	66.5
Total	100%	100%
N =	2602	3625

Chi-Square = 4.681 df = 1 p = .030

Table 8
Ownership of Cell Phones by Age
(unweighted sample)

Age	Ownership		Total	N =
	Yes	No		
10 – 19	9.5%	90.5	100%	1640
20 – 29	44.7%	55.3	100%	1661
30 – 40	50.2%	49.8	100%	1460
41+	26.3%	73.7	100%	1466
Total	32.4%	67.6	100%	6227

Chi-Square = 744.839 df = 3 p = .000

Table 9
Ownership of Cell Phones by Educational Background
(unweighted sample)

Educational Level	Ownership		Total	N =
	Yes	No		
Illiterate/Read & Write	9.5%	90.4	100%	1192
Primary	22.7%	77.3	100%	1499
Preparatory	33.8%	66.2	100%	1727
Secondary	45.3%	54.7	100%	1080
Post-Secondary	66.9%	33.1	100%	729

Chi-Square = 826.147 df = 4 p = .000

Table 10
Ownership of Cell Phones by Occupation
(unweighted sample)

Occupation	Ownership		Total	N =
	Yes	No		
Administrative/Managerial	78.9%	21.1	100%	90
Academic/Professional	74.5%	25.5	100%	302
Technical	62.2%	37.8	100%	193
Office Workers	56.3%	43.8	100%	48
Service/Sales	68.4%	31.6	100%	348
Agriculture	44.8%	55.2	100%	116
Blue Collar	62.2%	37.8	100%	376
Machine Operator	75.8%	24.2	100%	149
Vendor/Unskilled	58.5%	41.5	100%	484
Total	64.7%	35.3	100%	
N =	1363	743		2106

Chi-Square = 62.147 df = 8 p = .000

Table 11
Internet Use by Education
(unweighted sample)

Education Level	Knows & Uses Internet	Knows but Does Not Use	Does Not Know	Total	N =
Illiterate/Read and & Write	4.9%	32.6	62.5	100.0%	144
Primary	11.9%	36.7	51.5	100.1%	371
Preparatory	30.8%	41.1	26.1	100.0%	516
Secondary	44.0%	40.0	16.0	100.0%	418
Post-Secondary	56.3%	35.1	8.7	100.1%	462
Total	34.2%	37.9	27.9	100.0%	
N =	654	724	533		1911

Chi-Square = 391.896 df = 8 p = .000

Table 12
Internet Use by Gender and Region
(unweighted sample)

	Female		Male	
	West Bank	Gaza	West Bank	Gaza
Uses Internet	27.0%	20.7%	35.9%	51%
Doesn't Use	73.0	79.3	64.1	49.0
Total	100%	100%	100%	100%
N =	563	270	686	392

Females: Chi-Square = 3.814 df = 1 p = .051
Males: Chi-Square = 23.637 df = 1 p = .000

Table 13
Frequency of Internet Use by Gender and Household Subscription to the Internet
(unweighted sample)

Gender	Availability	Always	Sometimes	Never	Total	N =
Male	Yes	43.1%	38.9	18.0	100.0%	211
	No	8.7%	25.5	65.7	99.9%	870
	Total	15.4%	28.1	56.6	100.1%	
	N =	167	304	610		1081
Female	Yes	24.7%	43.2	32.1	100.0%	162
	No	4.0%	13.5	82.6	100.1%	683
	Total	7.9%	19.1	72.9	99.9%	
	N =	67	162	616		845

Males: Chi-Square = 209.353 df =2 p = .000
Females: Chi-Square = 177.200 df=2 p= .000

Table 14
Frequency of Internet Use
(unweighted sample)

Frequency of Use	Household Has Internet	Household Doesn't	Don't Know	N =
Always	35.1%	6.6%	-	234
Sometimes	40.8	20.2	1.0	467
Never	24.1	73.1	-	1232
Total	100.0%	99.9%	100.0%	-
N =	373	1553	7	1933

Chi-Square = 369.179 df = 4 p = .000

Table 15
Reason for Not Using Internet
by Region, Gender and Educational Background
(unweighted sample)

Reason for Not Using Internet	West Bank				Gaza Strip				Valid %
	Male		Female		Male		Female		
	< secondary	> secondary	< secondary	> secondary	< secondary	> secondary	< secondary	> secondary	
Don't know how	50.9%	23.3%	56.9%	45.3%	70.5%	23.4%	65.8%	48.5%	47.9%
Internet service not available	71.3%	67.2%	78.0%	69.1%	56.7%	59.6%	87.4%	71.5%	70.4%
Expensive	34.2%	38.2%	38.9%	36.1%	43.2%	40.8%	53.3%	49.1%	39.6%
No time	16.7%	26.9%	11.4%	29.3%	91.0%	33.4%	13.5%	27.6%	22.8%
No need	45.0%	44.3%	35.3%	50.8%	39.6%	54.6%	31.7%	51.8%	43.5%
Other	0.6%	1.1%	1.3%	1.8%	7.7%	2.9%		2.5%	1.5%

Table 16
Most Frequent Reason for Not Using Internet
by Region, Gender and Educational Background
(unweighted sample)

Most Frequent Reason Not Using Internet	West Bank				Gaza Strip				Valid %
	Male		Female		Male		Female		
	< secondary	> secondary	< secondary	> secondary	< secondary	> secondary	< secondary	> secondary	
Don't know how	15.9%	13.6%	31.9%	27.9%	53.9%	13.5%	37.1%	18.4%	24.6%
Internet service not available	49.2	45.0	44.7	40.3	12.7	34.3	49.4	25.4	39.5
Expensive	6.8	8.1	7.6	2.4	8.1	12.1	7.5	15.8	8.1
No time	6.7	8.8	2.4	5.1	1.9	11.7	0.7	6.2	6.9
No need	20.8	23.4	12.0	22.5	15.7	25.6	5.2	31.6	19.3
Other	0.6	1.1	1.3	1.8	7.7	2.9		2.5	1.5
Total	100.0%	100.0%	99.9%	100.0%	100.0%	100.1%	99.9%	99.9%	99.9%

Table 17
Computer Ownership by Region
(weighted sample)

Ownership	West Bank	Gaza	All
Yes	31.5%	25.4%	29.4%
No	68.5	74.6	70.6
Total	100%	100%	100%
N =	4017	2211	6228

Chi-Square = 25.571 df = 1 p =.000

Table 18
Computer Ownership by Locality
(Weighted)

Ownership	Urban	Rural	All
Yes	34.3%	19.5%	29.8%
No	65.7	80.8	70.2
Total	100%	100%	100%
N =	3639	1621	5260

Chi-Square = 117.982 df = 1 p = .000

Table 19
Computer Ownership by Education
(unweighted sample)

Educational Level	Ownership		Total	N =
	Yes	No		
Illiterate/Read & Write	13.4%	86.6	100%	1192
Primary	20.1%	79.9	100%	1499
Preparatory	24.0%	76.0	100%	1727
Secondary	33.2%	66.8	100%	1080
Post-Secondary	48.7%	51.3	100%	729
Total	25.5%	74.5	100%	6227

Table 20
Computer Ownership by Occupation
(unweighted sample)

Occupation	Ownership		Total	N =
	Yes	No		
Administrative/Managerial	48%	52%	100%	90
Academic/Professional	50%	50%	100%	302
Technical	42%	58%	100%	193
Office Workers	39%	61%	100%	48
Services/Sales	20%	80%	100%	348
Agriculture	7%	93%	100%	116
Blue Collar	19%	81%	100%	376
Machine Operator	22%	78%	100%	149
Vendor/Unskilled	16%	84%	100%	484

Chi-Square = 207.427 df = 9 p = .000

Table 21
Computer Use by Occupation
(weighted sample)

Occupation	Uses	Doesn't Use	Total	N =
Admin/Manager	56.0%	43.4	100.0%	83
Academic/Professional	74.2%	25.8	100.0%	264
Technical	53.2%	46.8	100.0%	165
Office Worker	73.8%	26.2	100.0%	42
Service/Sales	29.6%	70.4	100.0%	287
Agriculture	9.6%	90.4	100.0%	104
Blue Collar	19.8%	80.2	100.0%	354
Machine Operator	18.2%	81.8	100.0%	159
Vendor/Unskilled	11.1%	88.9	100.0%	476

Chi-Square = 468.259 df = 8 p = .000

Table 22
Computer Use by Gender and Education
(weighted sample)

Educational Level	Males			Females		
	Uses	Doesn't Use	Total	Uses	Doesn't Use	Total
Illiterate/Read & Write	21.5%	78.5	100.0%	12.2%	87.8	100.0%
Primary	31.2%	68.8	100.0%	27.5%	72.5	100.0%
Preparatory	40.0%	60.0	100.0%	33.5%	66.5	100.0%
Secondary	45.7%	54.3	100.0%	45.6%	54.4	100.0%
Post-Secondary	70.4%	29.6	100.0%	57.9%	42.1	100.0%

Males: Chi-Square = 255.427 df = 4 p = .000
Females: Chi-Square=250.045 df = 4 p = .000

Table 23
Attended Computer Training Courses
(weighted sample)

Yes	18.6%
No	81.4
Total	100.0%
N =	2222

Table 24
Reason for Not Using Computer
by Region, Gender and Educational Background
(unweighted sample)

Reason for Not Using Computer	West Bank				Gaza Strip				Valid %
	Male		Female		Male		Female		
	< secondary	> secondary	< secondary	> secondary	< secondary	> secondary	< secondary	> secondary	
Don't know how	86.4%	72.8%	88.1%	63.0%	87.4%	66.9%	89.3%	71.5%	83.3%
Expensive	59.7%	47.2%	49.2%	46.2%	70.1%	63.4%	63.2%	66.3%	58.8%
Waste of Time	12.7%	16.1%	15.0%	22.8%	14.5%	13.5%	15.0%	11.4%	14.5%
No need	39.2%	40.1%	37.3%	42.3%	38.8%	42.5%	39.4%	30.7%	41.3%
Harmful to Health	5.0%	7.0%	7.0%	7.8%	7.7%	7.8%	6.4%	9.9%	6.6%
Other	0.8%	3.2%	2.4%	3.6%	0.5%	1.8%	0.8%	1.5%	1.6%

Table 25
Most Frequent Reason for Not Using Computer
by Region, Gender and Educational Background
(unweighted sample)

Most Frequent Reason for Not Using Computer	West Bank				Gaza Strip				Valid %
	Male		Female		Male		Female		
	< secondary	> secondary	< secondary	> secondary	< secondary	> secondary	< secondary	> secondary	
Don't know how	65.5%	51.9%	66.3%	43.3%	59.3%	46.3%	62.9%	49.7%	59.5%
Expensive	18.3	23.4	17.7	29.5	25.1	29.6	22.0	33.33	21.8
Waste of Time	2.2	4.1	2.5	4.5	1.2	3.0	1.8	0.9	1.9
No need	13.4	17.7	11.4	19.3	13.2	21.1	13.0	12.9	15.4
Harmful to Health	0.1	0.6	0.1		0.6		0.1	1.8	0.3
Other	0.4	2.3	2.0	3.6	0.5		0.3	1.3	1.1
Total	99.9%	100.0%	100.0%	100.2%	99.9%	100.0%	100.1%	99.9%	100.0%

Table 26
Reasons for Not Using Computer*
(unweighted sample)

Reason	Percent	N =
Do Not Know How to Use	83%	3594
Expensive	59	2537
Waste of Time	14	626
No Need	41	1781
Harmful to Health	7	287
Other	2	68
Total		8893

*Multiple choices are allowed

Table 27
Ranking of Reasons for Not Using Computer
(unweighted)

Rankings		
Do Not Know How to Use	59%	2566
Expensive	22	943
Waste of Time	2	81
No Need	15	665
Harmful to Health	1	12
Other	1	49
Total	100%	4316

Table 28
Computer Use by Age
(unweighted sample)

Age (yrs)	Uses	Does Not Use	Total	N =
10-19	54.1%	45.9	100.0%	1640
20-29	31.7%	68.3	100.0%	1661
30-40	23.7%	76.3	100.0%	1460
41 +	10.3%	89.7	100.0%	1466
N =	1911	4316		6227
Total	30.7%	69.3	100.0%	

Chi-Square = 745.041 df = 3 p = .000

Table 29
Computer Use at Home by Age
(unweighted sample)

Age (yrs)	Uses	Does Not Use	Total	N =
10-19	47.9%	52.1	100.0%	888
20-29	48.1%	51.9	100.0%	526
30-40	61.6%	38.4	100.0%	346
41 +	77.5%%	22.5	100.0%	151
N =	1008	903		1911
Total	52.7%	47.3	100.0%	

Chi-Square = 60.92 df = 3 p = .000

Table 30
Computer Use at Work by Age
(unweighted sample)

Age (yrs)	Uses	Does Not Use	Total	N =
10-19	0.7%	99.3	100.0%	888
20-29	23.2%	76.8	100.0%	526
30-40	42.8%	57.2	100.0%	346
41 +	42.4%	57.6	100.0%	151
N =	340	1571		1911
Total	17.8%	82.2	100.0%	

Chi-Square = 398.443 df = 3 p = .000

Table 31
Computer Use at School by Age
(unweighted sample)

Age (yrs)	Uses	Does Not Use	Total	N =
10-19	69.4%	30.6	100.0%	888
20-29	28.1%	71.9	100.0%	526
30-40	12.1%	87.9	100.0%	346
41 +	12.6%	87.4	100.0%	151
N =	825	1086		1911
Total	43.2%	56.8	100.0%	

Chi-Square = 490.286 df = 3 p = .000

Table 32
Computer Use at Internet Cafes by Age
(unweighted sample)

Age (yrs)	Uses	Does Not Use	Total	N =
10-19	22.3%	77.7	100.0%	888
20-29	25.5%	74.5	100.0%	526
30-40	14.2%	85.8	100.0%	346
41 +	7.3%	92.7	100.0%	151
N =	392	1519		1911
Total	20.5%	79.5	100.0%	

Chi-Square = 34.443 df = 3 p = .000

Table 33
Computer Use at Friend's House by Age
(unweighted sample)

Age (yrs)	Uses	Does Not Use	Total	N =
10-19	32.4%	67.6	100.0%	888
20-29	37.3%	62.7	100.0%	526
30-40	24.3%	75.7	100.0%	346
41 +	13.9%	86.1	100.0%	151
N =	589	1322		1911
Total	30.8%	69.2	100.0%	

Chi-Square = 38.525 df = 3 p = .000

Table 34
Relationship Between Educational and Occupational Background of Heads of Households
(unweighted sample)

Occupation	Education					
	Ill./Read/ Write	Prim.	Prep.	Sec.	Post-Sec.	All
Admin/Mgr	3.4%	2.9%	2.5%	6.3%	6.0%	4.3%
Academic/Prof	-	0.2	0.7	0.8	53.5	14.3
Technician	-	3.4	4.2	9.9	21.1	9.2
Office Employees	0.6	0.5	2.3	5.6	1.8	2.3
Service/Sales	18.0	16.5	20.0	22.8	8.0	16.5
Agriculture	17.4	7.5	5.1	4.8	1.1	5.5
Blue Collar	19.7	27.1	24.7	18.5	2.7	17.9
Machine Operator	5.1	9.2	9.5	9.1	2.2	7.1
Vendor/Unskilled	36.0	32.7	31.1	22.3	3.6	23.0
Total	100.2%	100.0%	100.1%	100.1%	100.0%	100.1%
N =	178	413	570	395	550	2106

Chi-Square = 1345.869 df = 32 p = .000

Table 35
Computer Use at Clubs by Age
(unweightd sample)

Age (yrs)	Uses	Does Not Use	Total	N =
10-19	4.1%	95.9	100.0%	888
20-29	6.3%	93.7	100.0%	526
30-40	2.0%	98.0	100.0%	346
41 +	1.3%	98.7	100.0%	151
N =	78	1833		1911
Total	4.1%	95.9	100.0%	

Chi-Square = 13.135 df = 3 p = .004

Table 36
Computer Use at Youth Centres by Age
(unweightd sample)

Age (yrs)	Uses	Does Not Use	Total	N =
10-19	6.0%	94.0	100.0%	888
20-29	5.9%	94.1	100.0%	526
30-40	3.2%	96.8	100.0%	346
41 +	.7%	99.3	100.0%	151
N =	96	1815		1911
Total	5.0%	95.0	100.0%	

Chi-Square = 10.983 df = 3 p = .013

Table 37
Most Frequent Use of Computer by Place and Age
(unweighted sample)

Place	10-19	20-29	30-40	41+	All
Home	44.9%	40.7%	51.7%	62.9%	46.4%
Work	0.3	15.8	27.5	24.5	11.4
School	30.5	12.0	3.8	2.0	18.3
Internet Cafés	9.3	10.6	4.9	2.0	8.3
Friends	8.0	11.0	7.8	5.3	8.6
Clubs	1.1	1.7	0.0	0.0	1.0
Youth Centres	1.1	0.8	0.3	0.0	0.8
Other	4.6	7.4	4.0	3.3	5.2
Total	99.8%	100.0%	100.0%	100.0%	100.0%
N =	888	526	346	151	1911

Chi-Square = 407.593 df = 21 p = .000

Table 38
Internet Use by Age
(unweighted sample)

Age (yrs)	Knows & Uses Internet	Knows but Doesn't Use	Doesn't Know	Total	N =
10-19	21.8%	36.0	42.4	100.2%	888
20-29	48.1%	36.9	15.0	100.0%	526
30-40	38.2%	45.4	16.5	100.1%	346
41+	49.7%	35.1	15.2	100.0%	151
N =	654	724	533		1911

Chi-Square = 208.325 df = 6 p = .000

Table 39
Use of Internet by Age and Gender
(unweighted)

	Male		Female	
Age (yrs)	Uses	Doesn't	Uses	Doesn't
10-19	29.0%	71	14.0%	86.0
20-29	56.9%	43.1	39.4%	60.6
30-40	44.4%	55.6	25.4%	74.6
41+	50%	50	48.5%	51.5
N =	446	632	208	625

Males: Chi-Square = 59.991 df = 3 p = .000
Females: Chi-Square = 66.270 df = 3 p = .000

Table 40
ICT Index by Education
(weighted sample)

Education	Low					High	Total	N =
	0.00	1.00	2.00	3.00	4.00	5.00		
Illiterate/Rread & Write	55.3%	30.7	8.7	3.0	2.2	0.1	100.0%	1139
Primary	43.2%	33.8	13.5	6.3	2.6	0.8	100.2%	1591
Preparatory	34.6%	34.9	16.9	8.1	4.1	1.4	100.0%	1726
Secondary	28.5%	28.2	18.1	9.2	10.6	5.4	100.0%	1127
Post-Secondary	7.6%	27.4	22.3	11.6	16.3	14.9	100.1%	646
N =	2284	1984	952	453	361	195		6229

Chi-Square = 1043.51 df = 20 p = .000

Table 41
ICT Index by Occupation
(weighted sample)

Occupation	Low 0.00	1.00	2.00	3.00	High 4.00	5.00	Total	N =
Administrative/Managerial	4.9%	26.8	17.1	15.9	20.7	14.6	100.0%	82
Academic/Professional	7.6%	22.4	23.2	14.4	18.6	13.7	99.9%	263
Technician	9.0%	37.2	23.1	13.5	10.3	7.1	100.2%	156
Office Workers	14.0%	32.6	16.3	20.9	4.7	11.6	100.1%	43
Service/Sales	14.6%	44.4	24.3	6.9	4.9	4.9	100.0%	288
Agriculture	36.5%	54.8	3.8	2.9	.0	1.9	99.9%	104
Blue Collar	21.5%	43.1	20.4	6.8	6.2	2.0	100.0%	353
Machine Operator	13.8%	44.0	22.6	11.3	3.1	5.0	99.8%	159
Vendor/Unskilled	28.8%	40.3	20.8	5.5	3.4	1.3	100.1%	476
No Response	0%	66.7	33.3	.0	.0	.0	100.0%	3
N =	359	754	400	172	141	101		1927

Chi-Square = 347.657 df = 45 p = .000

Table 42
ICT Index by Age
(weighted sample)

Age	Low 0.00	1.00	2.00	3.00	High 4.00	5.00	Total	N =
10-19	44.9%	27.7	14.2	6.8	4.9	1.5	100.0%	2196
20-29	32.2%	34.6	15.6	6.8	7.0	3.8	100.0%	1510
30-40	31.6%	36.0	17.1	7.6	4.4	3.3	100.0%	1153
41+	32.7%	32.1	15.1	8.3	7.2	4.7	100.1%	136
N =	2284	1985	951	453	361	193		6227

Chi-Square = 138.136 df = 15 p = .000

Table 43
ICT Index by Refugee Status
(weighted sample)

Status	Low 0.00	1.00	2.00	3.00	High 4.00	5.00	Total	N =
Not Refugee	37.4%	31.2	15.3	6.7	5.9	3.5	100.0%	3590
Refugee	35.7%	32.8	15.2	8.0	5.6	2.6	99.9%	2638
N =	2284	1985	961	453	361	194		6228

Chi-Square = 9.882 df = 5 p = .079

Table 44
Computer Use by Gender and Education
(weighted sample)

Education	Males				Females			
	Uses	Doesn't Use	Total	N =	Uses	Doesn't Use	Total	N =
Illiterate/Read & Write	21.5%	78.5	100.0%	483	12.2%	87.8	100.0%	656
Primary	31.2%	68.8	100.0%	804	27.5%	72.5	100.0%	785
Preparatory	40.0%	60.0	100.0%	873	33.5%	66.5	100.0%	852
Secondary	45.7%	54.3	100.0%	587	45.6%	54.4	100.0%	542
Post-Secondary	70.4%	29.6	100.0%	398	57.9%	42.1	100.0%	247

Males: Chi-Square = 250.045 df = 4 p = .000
Females: Chi-Square = 255.427 df = 4 p = .000

Table 45
Payment for Internet Outside the Home
By Camp vs. Non-Camp Refugee Status
(weighted sample)

Outside Payment	Camp Refugee	Non-Camp Refugee	N =
Yes	51.1%	35.4%	184
No	48.9	64.6	273
Total	100.0%	100.0%	
N =	141	316	457

Table 46
Payment for Internet Outside the Home
By Locality
(weighted sample)

Outside Payment	Urban	Rural	N =
Yes	36.5%	38.8%	319
No	63.5	61.2	546
Total	100.0%	100.0%	
N =	713	`134	865

Chi-Square = .253 df = 1 p = .615

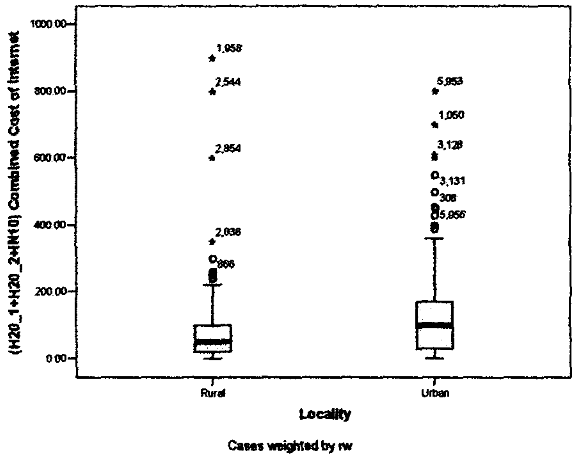
Table 47
Payment for Internet Outside the Home
By Region
(weighted sample))

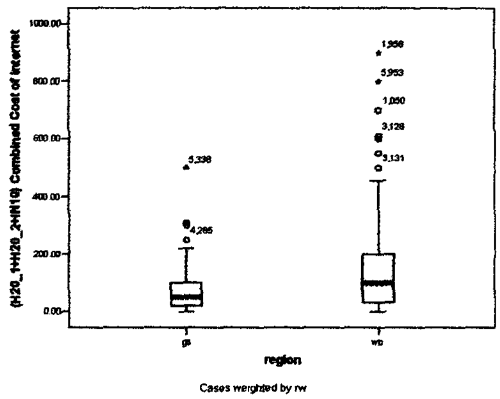
Outside Payment	West Bank	Gaza	N =
Yes	37.1%	42.3%	680
No	62.9	57.7	333
Total	100.0%	100.0%	
N =	620	393	1013

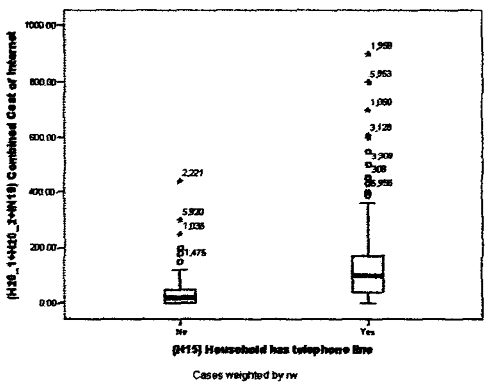
Chi-Square = 4.00 df = 1 p = .045

Appendix B

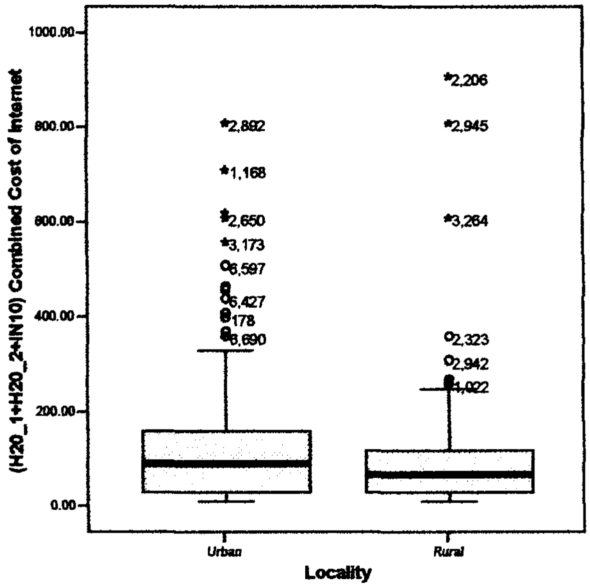
Boxplots: weighted samples

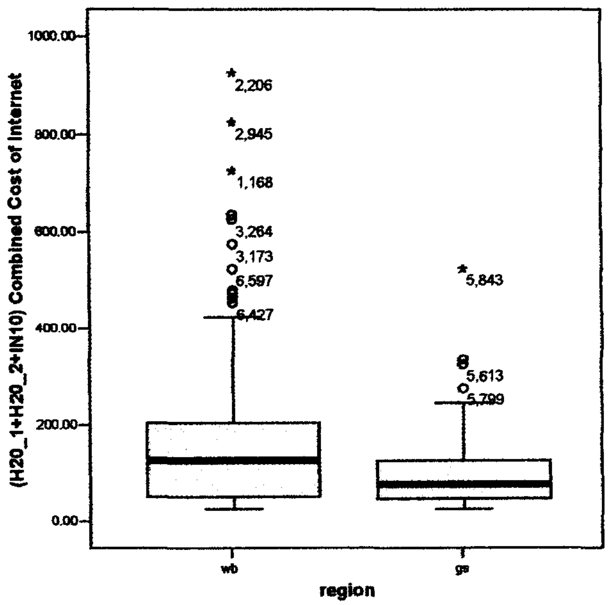


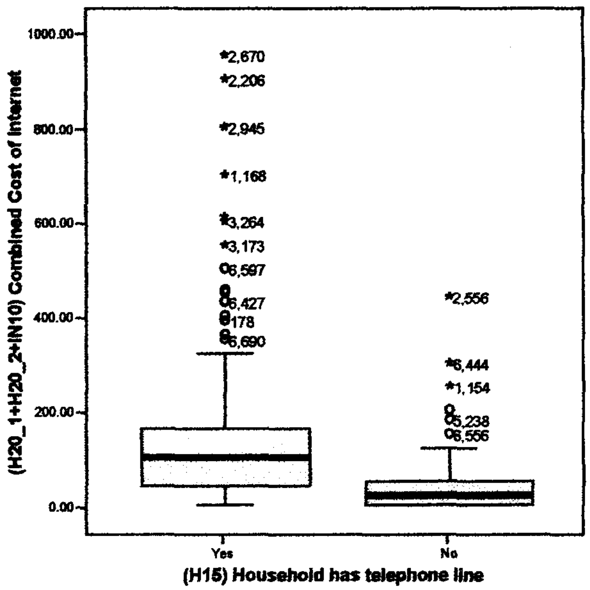




Boxplots: unweighted samples



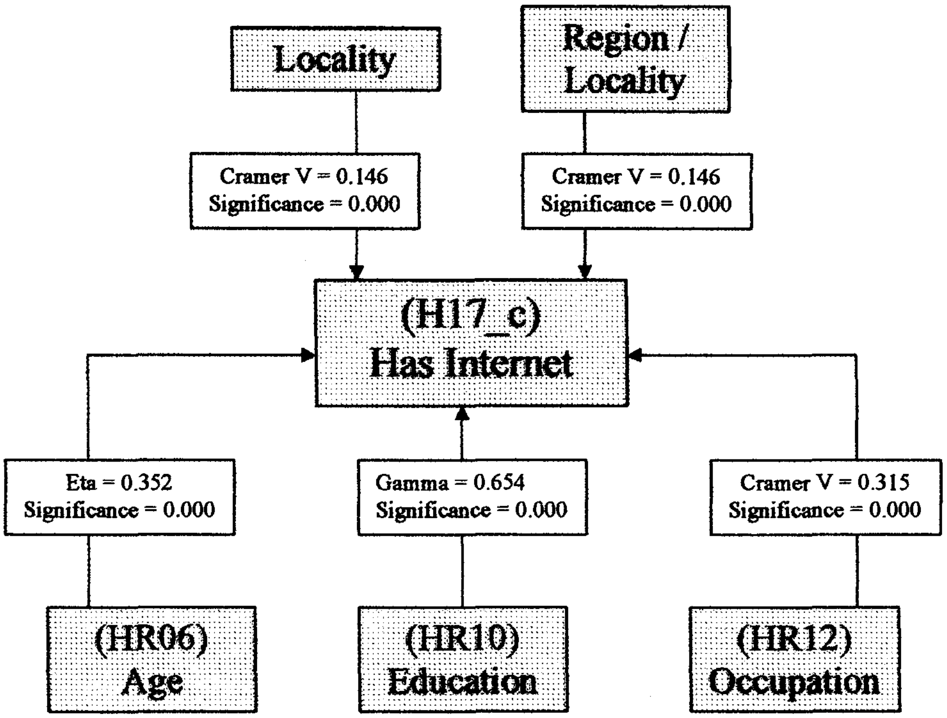




1000.00
800.00
600.00
400.00
200.00
0.00
(H20_1+H20_2+IN10) Combined Cost of Internet
*2,670
*2,206
*2,945
*1,168
*3,264
*3,173
o6,597
o6,427
o178
o6,690
*2,556
*6,444
*1,154
o5,238
o6,556
Yes
No
(H15) Household has telephone line

Logistic Regressions
Ownership of Internet

Subscription (Heads of HH only)
95%-significance relationships
(weighted model)



Regression Model
Has Internet (H17_c) Variable Encoding

Original Value	Model Value
No	0
Yes	1

Categorical Variables Coding

		Frequency	Parameter coding							
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(HR12_c) Occupation (collapsed)	Admin/Professional	67	0.889	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
	Academic/Professional	143	-0.111	0.889	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
	Technician	90	-0.111	-0.111	0.889	-0.111	-0.111	-0.111	-0.111	-0.111
	White Collar	22	-0.111	-0.111	-0.111	0.889	-0.111	-0.111	-0.111	-0.111
	Service/Sales	221	-0.111	-0.111	-0.111	-0.111	0.889	-0.111	-0.111	-0.111
	Agriculture	88	-0.111	-0.111	-0.111	-0.111	-0.111	0.889	-0.111	-0.111
	Blue Collar	270	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	0.889	-0.111
	Machine Operator	107	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	0.889
	Vendor/Unskilled	341	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
Education (collapsed)	Illiterate/Read & Write	130	0.8	-0.2	-0.2	-0.2				
	Primary	300	-0.2	0.8	-0.2	-0.2				
	Preparatory	375	-0.2	-0.2	0.8	-0.2				
	Secondary	272	-0.2	-0.2	-0.2	0.8				
	Post-Secondary	272	-0.2	-0.2	-0.2	-0.2				
Locality	Rural	460	0							
	Urban	889	1							
Age (collapsed)	10-30	412	0.75	-0.25	-0.25					
	31-37	389	-0.25	0.75	-0.25					
	38-50	367	-0.25	-0.25	0.75					
	51+	181	-0.25	-0.25	-0.25					

Fitted model

	Coefficient	Odds Ratio
Constant	-3.474	0.031
Age: 10-30	-1.412	0.244
Age: 31-37	-1.701	0.182
Age: 38-50	-0.403	0.668
Education: illiterate/read & write	-2.305	0.100
Education: primary	-2.367	0.094
Education: preparatory	-2.424	0.089
Education: secondary	-1.611	0.200
Locality: Urban	1.196	3.306
Occupation: Administrative/Managerial	1.386	3.999
Occupation: Academic/Professional	0.570	1.768
Occupation: Technician	-0.005	0.995
Occupation: White Collar	0.604	1.830
Occupation: Service/Sales	0.104	1.109
Occupation: Agriculture	-0.188	0.829
Occupation: Blue Collar	0.332	1.394
Occupation: Machine Operator	0.547	1.728

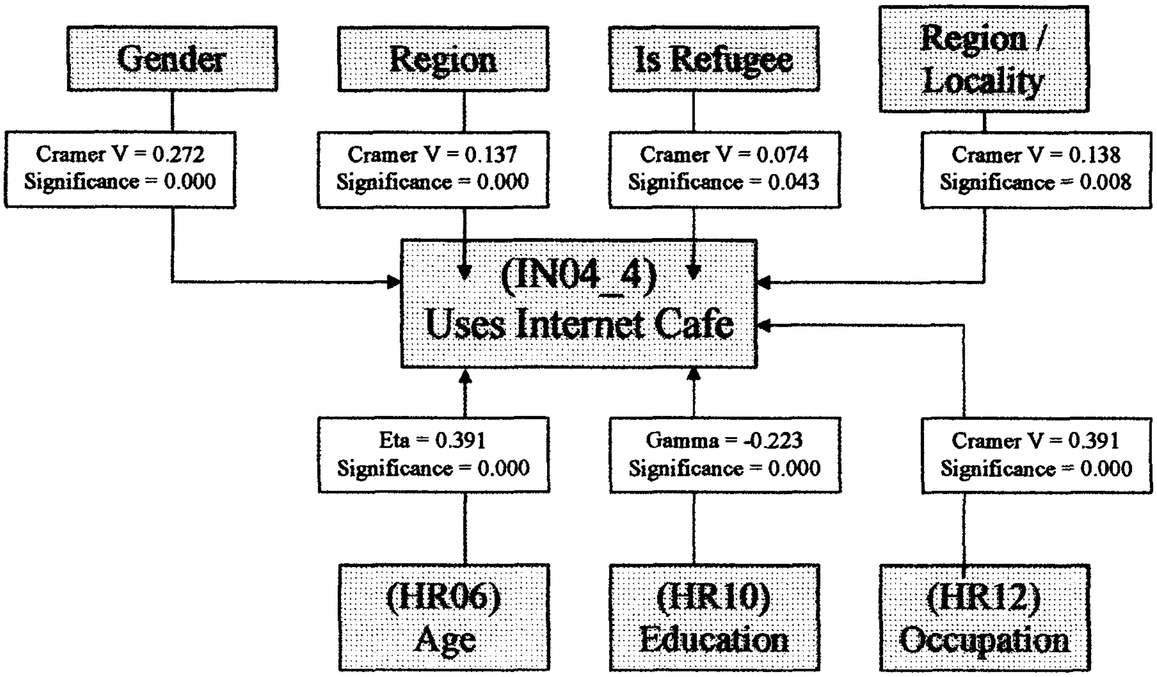
Hosmer-Lemeshov
significance = 0.354

Nagelkerke R-square: 0.338

Classification threshold: 0.11
Correct classification: 76.5%

Use of Internet Café

95%-significance relationships
(weighted model)



Regression Model
Uses Internet (IN04_4) Variable Encoding

Original Value	Model Value
No	0
Yes	1

Categorical Variables Coding

		Frequency	Parameter coding (1)	(2)	(3)
Age (collapsed)	10-19	194	0.750	-0.250	-0.25
	20-29	253	-0.250	0.750	-0.25
	30-40	132	-0.250	-0.250	0.75
	41+	75	-0.250	-0.250	-0.25
Region	Gaza Strip	256	0.500		
	West Bank	398	-0.500		
Gender	Female	208	0.000		
	Male	446	1.000		

Fitted model

	Coefficient	Odds Ratio
Constant	-1.698	0.183
Gender: Male	1.463	4.321
Region: Gaza	0.633	1.884
Age: 10-19	2.582	13.219
Age: 20-29	2.334	10.319
Age: 30-40	1.133	3.106

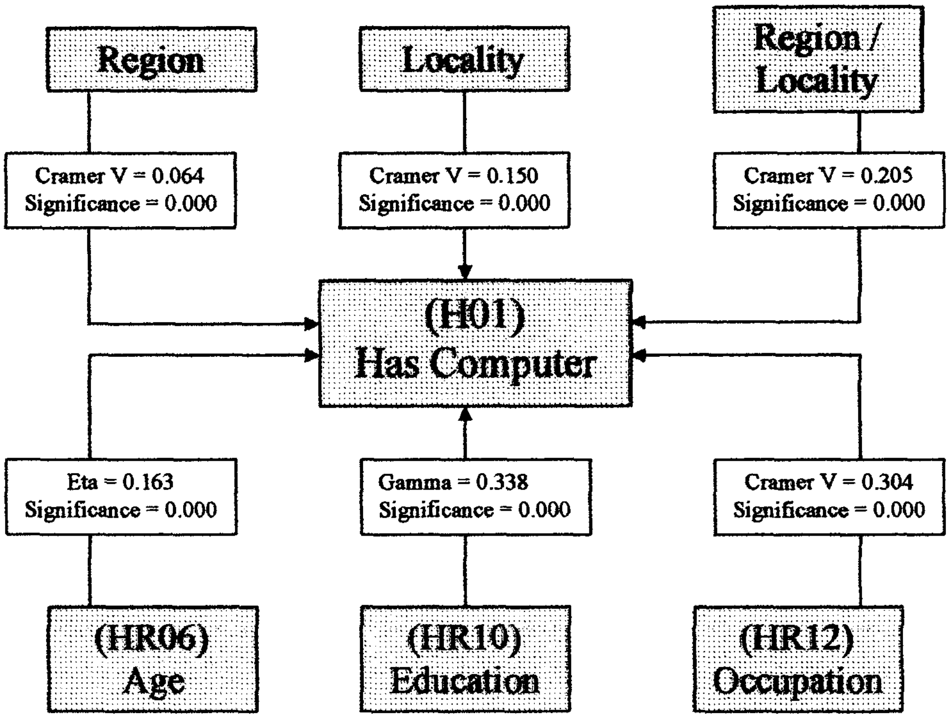
Hosmer-Lemeshov
significance = 0.060

Nagelkerke R-square: 0.246

Classification threshold: 0.5
Correct classification: 69.6%

Ownership of Computer

95%-significance relationships
(Weighted model)



Regression Model
Has computer (H01) Variable Encoding

Original Value	Model Value
No	0
Yes	1

Categorical Variables Coding

		Frequency	Parameter coding							
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(HR12_c) Occupation (collapsed)	Admin/Managerial	80	0.889	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
	Academic/Professional	247	-0.111	0.889	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
	Technician	149	-0.111	-0.111	0.889	-0.111	-0.111	-0.111	-0.111	-0.111
	White Collar	39	-0.111	-0.111	-0.111	0.889	-0.111	-0.111	-0.111	-0.111
	Service/Sales	278	-0.111	-0.111	-0.111	-0.111	0.889	-0.111	-0.111	-0.111
	Agriculture	108	-0.111	-0.111	-0.111	-0.111	-0.111	0.889	-0.111	-0.111
	Blue Collar	331	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	0.889	-0.111
	Machine Operator	132	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	0.889
	Vendor/Unskilled	401	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111	-0.111
Education (collapsed)	Illiterate/Read & Write	146	0.8	-0.2	-0.2	-0.2				
	Primary	362	-0.2	0.8	-0.2	-0.2				
	Preparatory	475	-0.2	-0.2	0.8	-0.2				
	Secondary	336	-0.2	-0.2	-0.2	0.8				
	Post-Secondary	446	-0.2	-0.2	-0.2	-0.2				
(RT2) Region and area type	West Bank, urban	721	0.75	-0.25	-0.25					
	Gaza Strip, urban	462	-0.25	0.75	-0.25					
	West Bank, rural	528	-0.25	-0.25	0.75					
	Gaza Strip, rural	54	-0.25	-0.25	-0.25					
Age (collapsed)	10-19	44	0.75	-0.25	-0.25					
	20-29	563	-0.25	0.75	-0.25					
	30-40	706	-0.25	-0.25	0.75					
	41+	452	-0.25	-0.25	-0.25					

Fitted model

	Coefficient	Odds Ratio
Constant	-1.186	0.305
Age: 10-19	-0.514	0.598
Age: 20-29	-1.280	0.278
Age: 30-40	-1.155	0.315
Education: illiterate/read & write	-2.240	0.106
Education: primary	-1.890	0.151
Education: preparatory	-1.094	0.335
Education: secondary	-0.681	0.506
Occupation: Administrative/Managerial	0.910	2.484
Occupation: Academic/Professional	0.410	1.506
Occupation: Technician	0.273	1.313
Occupation: White Collar	0.580	1.786
Occupation: Service/Sales	0.195	1.215
Occupation: Agriculture	-0.653	0.521
Occupation: Blue Collar	0.161	1.175
Occupation: Machine Operator	-0.003	0.997
Region/Locality: West Bank, urban	0.983	2.673
Region/Locality: Gaza Strip, urban	0.022	1.022
Region/Locality: West Bank, rural	0.185	1.203

Hosmer-Lemeshov
significance = 0.086

Nagelkerke R-square: 0.275

Classification threshold: 0.33
Correct classification: 71.8%

Appendix C

Methodology

When reading the statistical analysis regarding the demographic and social correlates of information and communication technology (ICT) in Palestine, it is important to keep the following points in mind. The methodological notes pertain solely to the 2004 national survey as carried out by the Palestine Census Bureau of Statistics (PCBS) and made available for purposes of analysis.

1. As recommended by PCBS, I have used their weighting factors. As stated by PCBS, the weights have been applied to each sampling unit of the survey:

    > Adjusting weights is important to reduce bias resulting from non-response. [Also], adjusting has given consideration to demographic changes since the time of the Population, Housing and Establishment Census, 1997 and the time of carrying out the survey. Furthermore, when adjusting weights and estimation of the size of the population in the Palestinian Territory and their distribution according to age groups, in the middle of the third quarter, 2004. Therefore the results, changes and ratios of this survey respect the reality in the Palestinian Territory during that period. (Palestinian Central Bureau of Statistics. *Computer, Internet and Mobile Phone Survey, 2004*. "Main Findings." Ramallah, Palestine, 2004. Available at http://www.pcbs.org).

2. Two types of data are used in the study: household and personal data. The sample contains 6779 households, and a single person is randomly chosen from each household for further interviewing. However, as shown in the table below, not all people reported their personal data. Because of this, some summary statistics, such as the breakdown of Internet subscribers, can be derived from the full sample of 6779 households, while others cannot. Another discordance in figures is due to the weighting procedure, which does not affect the correlations as such, but does alter the frequency counts.

Household Availability of Internet by Region

			Household has Internet service			Total
			Yes	No	Don't know	
Region	Gaza	Count	179	2023	8	2210
		% within region	8.1%	91.5%	.4%	100.0%
	West Bank	Count	423	3580	14	4017
		% within region	10.5%	89.1%	.3%	100.0%
Total		Count	602	5603	22	6227
	Per Cent		9.7%	90.0%	.4%	100.0%

3. The statistical chapter in the report uses mainly the weighted sample in bivariate and multivariate analysis, including logistic regression. For comparison purposes, Appendices A and B present the same results based on the unweighted version of the sample. It can be seen that the pattern and direction of the correlation measures are similar for the weighted and unweighted samples.

4. In order to ensure meaningful statistical and sociological inferences, certain background variables were collapsed into fewer categories. Thus when carrying out logistic regression, age was grouped into quartiles (10-30, 31-37, 38-50, 51+); educational background into illiterate/read and write, primary, secondary, post-secondary; and occupational background into administrative/managerial, academic/professional, sales/services, agriculture, blue collar, machine operators, and vendor/unskilled.

Human Capital and ICT Potential in Palestine: Creating an Enabling Environment

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Table of Contents

1. INTRODUCTION

> Information technology and telecommunications play a significant role in the development of society and the increase in the human levels of education, knowledge and economy. They also improve the global standard of living and contribute to inter-society integration.
>
> World Summit on the Information Society: Palestinian Paper, 2003

Dedication to education and learning have long been hallmarks of Palestinian society, as is reflected in the relatively high rates of literacy, higher education, and expenditure of public resources – the Ministry of Education and Higher Education allocation accounted for 22 percent of the total Palestinian National Authority (PNA) budget in 2004. As was articulated in the 2000 strategic vision statement, Pathway Toward A Palestinian Vision For 2005 And Beyond: Report Of Progress On The Palestinian Strategic Development Plan:

> "The extraordinary array of resources on which to build the foundation for Palestinian development will be a key to its success. The first and foremost of these is represented in the *Palestinian people*, who are dedicated to education and to learning, steadfast in their concern for community and society as a whole, and dedicated to efforts aimed toward sustainable development... the management of science, technology and innovation is a linchpin [for such development]. Indeed, *scientific research, technology and innovation* will be the basis for sustainable economic and social development for Palestinian society. Palestinians have long been cognizant of the critical nature of this fact, as is evident in the number of universities, research centers, and percentage of science and technology graduates, the extent of technological innovation with limited resources, including in the areas of manufacturing, computer software and information technology in general."[1]

How can the extraordinary individual and cultural history of dedication to learning, in spite of the circumstances of occupation—in particular lack of geographic access to educational programs due to closures, curfews, and the barrier wall—be maximally used to improve Palestinian education and further to contribute to development? Increasingly, information and communications technology is seen by Palestinians and others as a mechanism to achieve this goal. For the purposes of this chapter, information and communications technology (ICT) is defined as the pervasive use – in all systems and organizational functions – of technology for data acquisition, communication, coordination, analysis and decision support, with technology encompassing both hardware and software. In education, ICT enhances and supports learning; for example, "word processing and email promote communication skills; data base and spreadsheet programs promote organizational skills; and modeling software promotes the understanding of science and mathematical concepts."[2]

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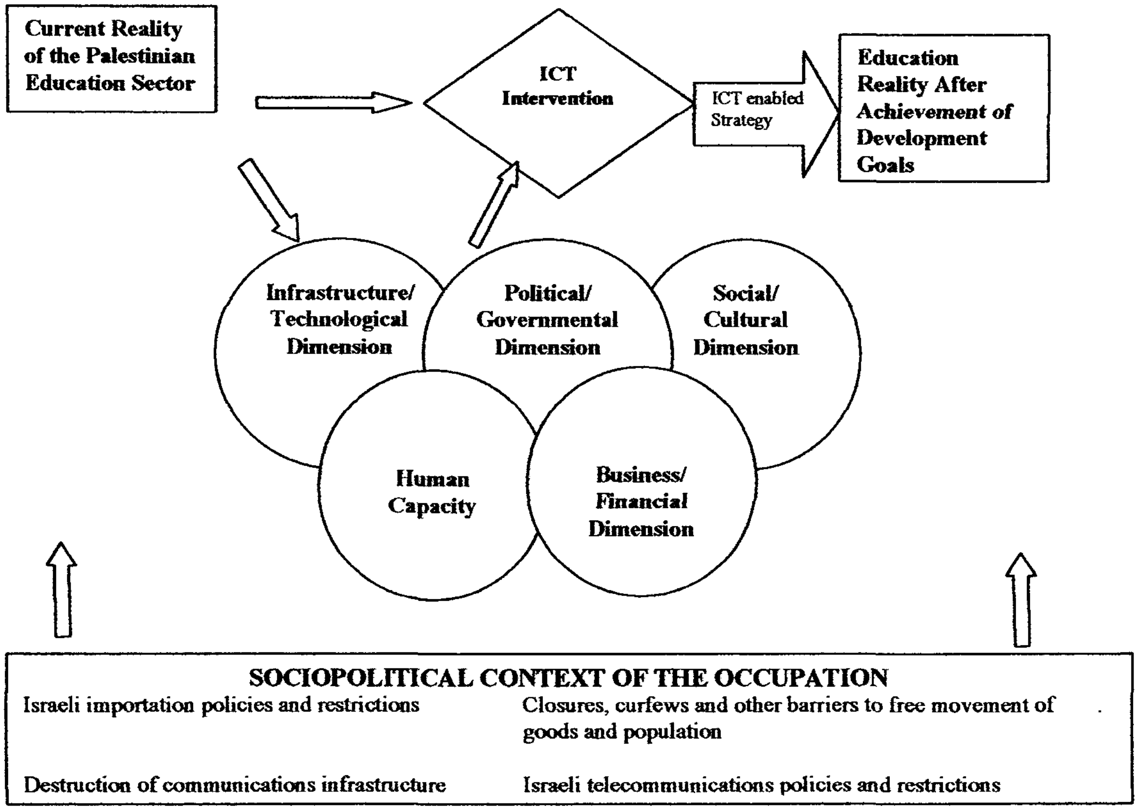
[1] Ministry of Planning. (2000). Pathway Toward A Palestinian Vision For 2005 And Beyond: Report Of Progress On The Palestinian Strategic Development Plan. Ramallah, p. 6.

[2] United Nations Development Program. (2003). Information and Communication Technology as an Enabler of the Development Process in the West Bank and Gaza. Jerusalem: UNDP: Programme of Assistance to the Palestinian People, pp. 22-23.

1.1 Conceptual Framework: Bringing it All Together

In 2003, the United Nations Development Programme (UNDP) issued a comprehensive report on ICT in Palestine. The report argued that "ICT can act as an enabler, improving the efficiency, reach and impact of development strategies employed" for the education, health, economic activity and governance sectors. The UNDP report depicted the relationship between the components of the development dynamic, education as an example of one of the key sectors, and ICT interventions, in graphic form. This figure has been adapted – adding categories of causative and resultant factors from Rand's report on *The Information Revolution in the Middle East and North Africa*, and including the sociopolitical factors of the occupation that impact on education and ICT development.

Figure 1: Conceptual Framework



On the left of Figure 1 is the current reality of the education sector. ICT interventions in this sector improve the effectiveness, reach and rapidity in achieving these goals (illustrated by the wider and shorter arrow to the right of the ICT intervention). The development dynamic illustrated by the intersecting circles affects and is affected by the implementation of the ICT intervention and the likelihood of its success. Similarly, the current reality of the education sector affects the development dynamic and its ability to adequately support the intervention. The impact of Israeli policies and the circumstances of the occupation impact on the entire dynamic.

This chapter focuses on those factors in the education sector that impact on the development of ICT in Palestine (e.g., distribution of computers in the classrooms, the introduction of courses in technology to grades 5-9, allocation of funding for new technology in the classrooms), and the impact that ICT could have on education and on development in Palestine generally. The paper is based primarily on reviews of existing documents, including new textbooks developed by the Ministry of Education. Other papers in this series address issues related to ICT in Palestinian development broadly.

2. THE EDUCATIONAL SYSTEM IN PALESTINE: OVERVIEW

2.1 Goals of the Palestinian Educational Sector

The Ministry of Education (MOE) Five Year Education Development Plan 2000-2005, launched at the eve of the *intifada* in September 2000, is the guiding instrument for development in the education sector in the West Bank and Gaza for basic and general education, vocational education, non-formal education, literacy education and adult education. The Ministry's vision, expressed in the Plan, was based on the premise that there is an inextricable relationship between the education system and the economy: the education system must provide the economy with the education and trained manpower it needs to progress, and the government needs to allocate sufficient resources to the education sector to enable it to effectively achieve its goals.

In 2002, the Ministry of Higher Education developed a higher education plan that proposed reform strategies with respect to financing, access to, and quality of higher education. This plan articulated five goals, covering preschool, basic, secondary, and non-formal education; these goals were:

1. to provide access to education for all children,
2. to improve the quality of education,
3. to develop formal and informal education,
4. to develop management capacity in planning, administration and finance, and
5. to develop human resources of the education system.

Core Principles for Educational Development in Palestine

- Education as a human right
- Education as the basis for citizenship
- Education as a tool for social and economic development
- Education as the basis for values and democracy
- Education as a continuous, renewable and participatory process

Five-Year Education Development Plan 2000-2005 (Palestine Ministry of Education)

There was indirect reference to information technology (IT) in Goal 2.4: modernize and add school facilities. The projected allocation for public expenditures related to computers in the classroom for the four year period 2000/01-2004/05 included:

- Workshop for computer teachers $ 50,000
- Setup and rehabilitating of computer labs $2,921,000
- Construction of technology center $ 270,000

This total of $3,241,000 represented approximately 2 percent of the total planned public education budget for the period. In retrospect, that was significantly below the needs, even assuming that there would be an infusion of donor funds for ICT.

In 2002, the Ministry of Higher Education developed a plan that proposed reform along the following principles:

- targeting public funds to programs identified as having high priority,
- promoting demand-side financing mechanisms,
- promoting quality through competitive funding of selected projects,
- promoting institutional investments for expanding capacity and improving quality through competitive grants and resource mobilization,
- promoting research through competitive funding, and
- improving the management of the HE sector and its institutions.

The MOE and MOHE were combined into the MoEHE in 2003; although there has been no combined strategic plan since that time, a strategic planning process is in place and was expected to be completed by the end of 2005.

2.2 The Palestinian Socioeconomic Context

In 2003, according to World Bank estimates, GDP was 23 percent lower than in 1999; taking population growth of over 5 percent into account, real GDP per capita was some 35 percent below its pre-*intifada* level. Estimates of the proportion of Palestinians living below the poverty line of US $2.10 daily per person vary, but all fall within a range from 38-51 percent (World Bank) to 58 percent (University of Geneva).[3] According to PCBS reports based on an April-June 2004 survey, nearly 47 percent of Palestinians – around 1.7 million people – live below the official poverty line of US$2.10 daily per person,[4] and more than 600,000 people (16 percent of the population) are classified as extremely poor, unable to afford even the basic necessities for subsistence. Children constitute a particularly vulnerable group – some 70 percent of Palestinian children live in families that are either poor or extremely poor. There are also significant differences between the West Bank and Gaza, with just over half of Palestinians in the West Bank living below the poverty line, compared with 71 percent of Gaza residents.

After almost four years of the *intifada*, average Palestinian income has declined by more than a third, and a quarter of the workforce is unemployed. The effect of employment on household poverty levels is strong: individuals living in households with one or more unemployed member are more than twice as likely (29 percent) to be poor than other households (11 percent). Four

[3] The World Bank. (2004). Poverty in the West Bank and Gaza After Three Years of Economic Crisis. Washington, D.C.: The World Bank.
[4] Palestinian Central Bureau of Statistics. (2004). Impact of the Israeli Measures on the Economic Conditions of Palestinian Households (9th Round: April-June, 2004), p. 9.

years of economic crisis have also severely compromised Palestinian living standards. One of the key factors is the high rate of dependency. In 1999, each Palestinian worker supported five people (including him- or herself). In the second quarter of 2002, the dependency ratio peaked at 7.2 as employment levels plummeted.

As job growth picked up in 2003, the dependency ratio fell to 6.2. Nevertheless, in 2003 the salary of each worker supported more than one additional household member compared with 1999. In 2000, during the first quarter of the *intifada*, 94 percent of the poorest families reported reducing their consumption; by 2003, 46 percent of this population reported reducing consumption – perhaps reflecting the fact that there is scant ability to reduce consumption much further. Moreover, 88 percent of Palestinians overall, and 95 percent of those living in Gaza responding to the April-June 2004 household survey, reported decreasing food expenditures in the previous 12 months, contributing to rising under- and malnutrition among Palestinian children.

Whatever the true portion of the population below the official poverty line, it is so high – roughly half the population – that the distinction between the poor and the non-poor has limited practical relevance for the PA, NGOs, and donors that support them. According to a recent World Bank poverty report, even if resources could be transferred to poor households with complete accuracy (perfect targeting) and with no administrative costs (zero channeling costs), about US$400 million per year would be required to bring everyone up to the poverty line. If typical costs for administering assistance and typical targeting errors are added, this figure could easily double, far above the resources currently devoted by the PA, donors and NGOs to alleviating poverty in Palestine. In 2002, for example, donors disbursed US$200 million for employment generation programs, food and cash assistance.[5] Given limited resources, donors and policy makers are naturally concerned that the resources available should be targeted to the poorest – those who face difficulty maintaining the consumption necessary to subsist.

The Palestinian labor market can be characterized broadly by a rapidly expanding labor force, with high rates of population growth, literacy, and school completion, combined with high unemployment rates, a large civil service, and regional differentiation between the West Bank and Gaza strip. The PA labor force increased by 14 percent from 2000-2004.[6] Insufficient local demand for the growing labor force and restricted opportunities for employment in Israel have led to high rates of unemployment of 25.7 percent in 2003, compared to 11.9 percent on the eve of the *intifada*.[7] The unemployment rate in Gaza (29 percent) continues to be higher than in the West Bank (24 percent), but the gap between the two narrowed in 2003.[8]

In this precarious economic context, expansion of ICT and its linkages with the educational system are even more important.

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[5] World Bank.

[6] PCBS Labor Force Surveys, various issues.

[7] PCBS Labor Force Surveys, various issues, cited in: Table 2.1, Forty-two Months – *Intifada*, Closures and Palestinian Economic Crisis: An Assessment, The World Bank, June 2004.

[8] The World Bank. (2004). Four Years – Intifada, Closures and Palestinian Economic Crisis: An Assessment. Washington, D.C.

2.3 Structure of and Key Indicators for the Palestinian Educational System

The Palestinian school system at the basic (elementary) and secondary levels serves more than 1 million students – almost a third of the entire Palestinian population. In addition, approximately 62,000 children attend kindergartens, mostly run by NGOs. The Palestinian Authority (through the MoEHE) is the main provider of basic education, with about 589,000 students at the basic education level and 100,000 at the secondary level. UNRWA (The United Nations Relief and Works Agency) provided primary education to some 248,000 students in the 2002-2003 school year, and approximately 55,000 students attended private schools.

The number of children in public schools has increased by 15 percent during the current *intifada,* reflecting both population growth and increased demand for teachers, new schools and classrooms. The growth in UNRWA's enrollment has been slightly lower, but still considerable. Private schools have witnessed a decline in enrollment since 2001 – perhaps an indication of the economic hardship that Palestinian families have experienced during the past three or four years. UNRWA provides nearly a third of basic education services, in addition to health, relief and social services, to almost 1.6 million registered refugees in the West Bank and Gaza, with 922,000 registered refugees residing in Gaza and 665,000 residing in the West Bank. Registered refugees make up about two-thirds of the population in Gaza. UNRWA is the second-largest service provider in the West Bank and Gaza after the PA. Under its regular operations, about 250,000 primary-school pupils were enrolled in UNRWA's 272 schools in 2003, equivalent to 30 percent of all primary-school pupils in the West Bank and Gaza.

Table 1: Basic Statistics for the Palestinian School System

School enrollment by provider				
School year	**Basic school**			**Secondary school**
	PA	**UNRWA**	**Private**	**PA**
1999-2000	514,000	223,000	56,000	73,000
2000-2001	539,000	232,000	59,000	76,000
2001-2002	565,000	242,000	57,000	84,000
2002-2003	589,000	248,000	55,000	92,000

Source: PCBS[9]

There are 11 universities and six colleges offering bachelor degrees in Palestine, with five having multiple campuses or branches.[10] Al Quds Open University, for example, has 11 campuses and Al Quds University has seven campuses.[11]

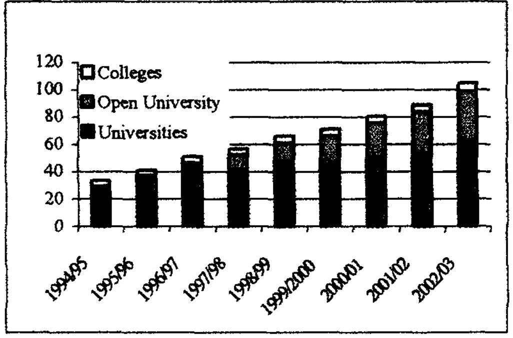
[9] PCBS data are not disaggregated into primary and secondary education. UNRWA provides basic education from grades 1-9 and no further education beyond that level.

[10] United Nations Development Program. (2003). Information and Communication Technology As an Enabler of the Development Process in the West Bank and Gaza. Jerusalem: UNDP: Programme of Assistance to the Palestinian People, p. 27.

[11] PASNET Technical Committee. (1998). Design, Justification, Specifications and Training for Setting up the Palestinian Academic and Scientific Network.

Demand for higher education, especially for university education, has increased over the past decade. From the 1995-1996 to the 2002-2003 school years, the number of students tripled from about 33,000 to 100,000,[12] translating into a gross enrollment rate of 23 percent in 2003. Most universities have exhausted their expansion capacity and are not in a position to meet the demand from an increasing number of secondary school graduates. (See Figure 2.)

Figure 2: Higher Education Enrollment (1,000 people)



Source: MoEHE and PCBS

2.4 Quality in the Palestinian Educational System

The Palestinian educational system has managed to sustain performance in two quality indicators at pre-*intifada* levels: student/teacher ratio and the student/classroom ratio. Both indicators are considerably higher (that is, the indicators are poorer) in Gaza than in the West Bank.

Table 2: Two Indicators of School Quality at the Basic and Secondary Levels

Level of Education		1999/00	2000/01	2001/02	2002/03	2003/04
	Student/Teacher ratio					
Basic Education	Gaza	32	32	30	30	33
	West Bank	28	26	26	28	25
Secondary	Gaza	28	26	29	29	33
	West Bank	21	21	23	18	20
	Student/classroom ratio					
Basic Education	Gaza	43	43	43	42	42
	West Bank	34	34	34	34	33
Secondary	Gaza	39	39	39	40	40
	West Bank	27	28	28	28	27

Source: MoEHE

In 2003, the MoEHE constructed a total of 1,476 classrooms. Not counting class-rooms destroyed in violence, an estimated 1,100-1,200 new class rooms would be needed to accommodate the new intake. By exceeding this number, the MoEHE attempts to fulfill the five-year plan goal of gradually decreasing class-sizes.

[12] It should be noted, though, that much of the increase in enrollment is due to the rapid expansion of the Al-Quds Open University, which is mostly based on distance learning.

While the quality of primary education has been maintained, the quality of higher education is deteriorating. Recruitment of teaching staff and expansion of university facilities have not kept pace with expanding enrollment in higher education. The recent *Assessment of Higher Education Needs in the West Bank and Gaza*[13] points to a steep decline in proxy indicators of quality. The share of full-time to total faculty dropped from 82 percent in 1996-1997 to 64 percent in 2000-2001, and the ratio of students to full-time faculty has increased from 26 to 41 in the same period. Universities have tried to compensate for the decline in full time faculty by hiring temporary and part-time staff, but the student-teacher ratio nevertheless increased from 22:1 to 26:1. Assessments of the higher education system[14] emphasize the decreasing relevance and academic quality of university programs.

Table 3: Indices of Quality of Education at Palestinian Universities (not including colleges)

	% Full Time Faculty	Student/ Teacher Ratio	Student/ Full Time Teacher
1996/97	82	22	26
1997/98	78	24	30
1998/99	64	22	34
1999/2000	65	23	35
2000/01	67	25	38
2001/02	64	26	41

Source: An Assessment of Higher Education Needs in the West Bank and Gaza, USAID/AED, September 2003.

2.5 Recent Trends in Educational Financing and Outcomes

From 1994 to 2000, the MOE and MoEHE developed and successfully implemented medium-term strategies for education reform, including preparation of unified curriculum for the WBG. Since 2000, the MoEHE has had to focus on the emergency situation, primarily with respect to access, while addressing the medium and longer term development objectives insofar as possible.

Since 1994, the PA has been relatively successful in expanding access to education. However, the young population, combined with high population growth,[15] decreased public resources available for investment in the education system, and a high poverty rate[16] combine to present major challenges to the MoEHE's ability to ensure access. The MoEHE estimated that the school-age population would have increased by some 30 percent between 2001-2006, with rapidly rising numbers of students in secondary and post-secondary education. University-level enrollments already have tripled over the past six years. This trend is

> Of 1,497 government schools, 1,195 (80%) include technology as a subject, but only 617 have computer labs. The MoEHE Five-year plan called for adding approximately 50 computer labs each year—simply insufficient to met the needs of rapidly expanding student body.
>
> Ministry of Education and Higher Education, 2004

[13] *An Assessment of Higher Education Needs in the West Bank and Gaza*, USAID/AED, September 2003.
[14] For example the *Higher Education Financing Strategy*, op cit.
[15] PCBS, 2004.
[16] *Forty-Two Months – Intifada, Closures and Palestinian Economic Crisis (Draft)*. World Bank, 2004.

expected to continue, with a projected doubling of enrollments in higher education by 2010.

The achievements of the Palestinian education system (net enrollment rates in West Bank and Gaza basic education – grades 1-10 – are among the highest in the region) are being eroded by the impact of the current crisis. From a peak rate of 92.2 percent on the eve of the *intifada*, the net enrollment rate (defined as the official age-group for a given level of education expressed as a percentage of the corresponding population) has declined every year, and currently stands at 88.4 percent for 2003-2004, though the number of children enrolled in basic education has continued to climb due to underlying growth in the number of school-age children. The decline in basic school enrollment rates has not yet transmitted to enrollment rates in the secondary level, which have continued to increase; there will naturally be a delay of some years before a declining basic enrollment rate is reflected at the secondary level. After dipping during the first year of the *intifada* (Figure 2), enrollment rates in secondary education have increased steadily to exceed the 50 percent mark in the 2003-2004 school year. This is almost 20 percentage points higher than 10 years ago.

Access to education has not been reduced as a result of families' inability to pay the annual school fee. In order to maintain access, the MoEHE determined that access would not be denied to non-paying families by waiving school fees for parents who are no longer able to make their contributions. Still, in the beginning of the 2003-2004 academic year, 73.2 percent of the 6-18 year olds out of school were poor in the West Bank. In Gaza the share of poor among those out of school amounted to 88.5 percent.[17] There is a lack of reliable data in the MoEHE to explain why children drop out or are out of school, irrespective of MoEHE's efforts to ensure financial access.

While this decision was certainly well-intentioned and arguably justifiable given the circumstances, the absence of consequences for not paying fees creates obvious moral hazards. The steep increase in the share of non-payers in 2003 (when the broader economic situation improved) might be a manifestation of this problem.

3. EDUCATION IN PALESTINE: CURRICULUM, ISSUES AND CHALLENGES

3.1 Early Childhood Education

Early childhood education (ECE) is predominantly provided by the private sector and NGOs, with the involvement of the MoEHE limited to legal and technical supervision. The MoEHE acknowledges the importance of pre-school education and is seeking to assume more responsibility for developing and implementing standards for ECE; however, there is no appropriate legislation on which to base this strengthened role of the MoEHE. Overall, the demand for early childhood education is limited due to the low participation rate of women in the formal labor force. However, there is increasing interest in early childhood development (ECD) among Palestinian educators, and the MoEHE works collaboratively with NGOs that have

[17] *The Impact of the Israeli Measures on the Economic Conditions of the Palestinian Households*. Palestinian Central Bureau of Statistics, October 2003.

provided ECD educational services for nearly a decade. There have been no recent studies of the availability and use of ICT in ECE in Palestine.

3.2 Elementary and Secondary Education

The net enrollment rates in basic education (grades 1-10) are very high and have remained relatively stable even during the current *intifada*. However, in 2002-2003 the net enrollment rate in basic education dropped by 3 percentage points to 88.4 percent. While this is an alarming decrease, it would be premature to conclude that this drop constitutes a new trend after three years of *intifada*. The net enrollment rate at secondary level (grades 11-12) has increased steadily in the past years from 44.5 percent in 1999-2000 to 49.4 percent in 2003-2004. This falls short of the stated goal to increase enrollment at secondary level to 68 percent by 2004.

Further undermining the effectiveness of schooling are closures and curfews, and the prevailing violence. On average, 0.4 percent of schooldays were lost due to violence and curfews during the 2003-2004 academic year. While this is a decrease from 3.3 percent in 2002-2003, the impact of violence and closures on schooldays varies considerably according to location; for example, Rafah in Gaza saw a sharp increase in the proportion of schooldays lost: 3.2 percent in 2003-2004, up from 1.8 percent in 2002.

Since the first *intifada*, there has been an increased focus on science and technology at both the basic and secondary levels, and in 2003 a subject specifically related to technology was introduced in secondary schools. This subject, taught by science graduates, including engineers, is part of an initiative to address technology through basic and secondary education as a means of promoting ICT in the educational system.

Table 4 presents the topics covered and learning objectives for each of the texts. The texts, developed by the MOE Curricula Center, specifically integrate – at all grade levels – the practical application of different topics, professional skills, engineering, industrial, machines, environment, agriculture, and computer technology. Each unit addresses each subject in a way that builds on previous learning (in the prior year's curricula), relates science and technology to everyday life of the students, and focuses on either new topics or advanced learning related to prior topics covered (e.g., energy, mechanics). The texts, with age- and grade-appropriate language, clear and interesting diagrams, and photographs that are relevant for the Palestinian context, are likely to encourage interest in and engagement with technology generally and, given an emphasis on computers in the texts, in ICT specifically.

It is important to determine as objectively as possible the capacity of Palestinian students to learn and use – and indeed to be developers of – ICT. One independent assessment of education quality is the TIMSS, an international study of standards and quality in general education.[18] The recently-released results show that Palestinian grade 8 students are at midpoint or lower in the ranking of eight participating Middle East and North African (MENA) countries. Palestinian

[18] TIMSS, the Trends in International Mathematics and Science Study, is designed to help countries all over the world improve student learning in mathematics and science. It collects educational achievement data at the fourth and eighth grades to provide information about trends in performance over time together with extensive background information to address concerns about the quantity, quality, and content of instruction.

students ranked fourth out of eight MENA countries for science (an average score of 435, compared to the international average of 474) and seventh out of eight MENA countries for mathematics (an average score of 390 compared with an international average of 467). This result is particularly notable given that Jordan – 50-60 percent of whose population is of Palestinian origin – ranks first among the eight MENA countries in science (with a score of 475) and second in mathematics (with a score of 424). Unfortunately, there are no pre-*intifada* data to use for comparison purposes, to determine the impact of the conflict on student learning. These results provide important information on which to base plans for ICT and should be considered in light of the lack of computer facilities and materials available in the schools.

Table 4: Ministry of Education Grades 5-9 Technology Texts: Topics Covered and Education/Learning Objectives

Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
Topics Covered				
1. Introduction to design and technology. 2. Energy, its forms and transformation. 3. Dismantling and assembling 4. Computers	1. Science and Technology 2. Design and signs 3. Computers 4. Production of machines 5. Energy	1. Design and signs 2. Energy, 3. Computers 4. Dismantling and assembling	1. Design/ drawing and signs 2. Electrical condensers 3. Computers 4. Dismantling and assembling	1. Geometric drawing 2. Materials in our lives 3. PowerPoint 4. Electricity at Home 5. Communication and network
Education/Learning Objectives The text books not only introduce different new concepts and topics in technology, but also open the horizon for practical implementation for simple topics/concepts in a scientific way. The series is also designed to facilitate communication about basic technology concepts in such a way that will encourage understanding of technology and its usage in society. At each level, the texts instruct students in problem-solving through team education (teaching) which will enhance the capacity and skills of the students to address a variety of practical issues. Individually specified objectives are presented below.				
This first textbook, an introduction to technology operation and concepts, serves as a foundation for the subsequent curricula in the series. **Unit # 1:** understand concepts of design and technology; develop simple designs; understand the process to implement simple a technology project; and know basic technology signs and symbols and their relationships **Unit # 2:** gain knowledge with regard to energy forms and transformation; differentiate between	**Unit #2:** learn about the designs for tools and their usage, geometric designs, learn how to design simple objects, and learn about signs that are used in daily life. **Unit # 3:** knowledge and skills re: entry and retrieval of data and information; understand memory and the Central Processing Unit – saving units, files, operation system (Windows 98), Archives	**Unit # 2:** understand the components of and learn how to install electrical circuits; understand electrical resistance and its colors, alternate resistance and its usages; know different electrical signs; know how to use different electrical measures. **Unit # 3:** Steps to undertake when purchasing a computer, include an introduction to hardware components, word	This text focuses on advanced concepts and skill-building in technology, focusing on electrical systems and computers. **Unit # 3:** Use of Microsoft Word, introduction to Excel, and how to use Excel	This text emphasizes the social dimensions or impact of technology and encourages its responsible use. For example, the text instructs students re: energy consumption, safe use of power and electricity, the impact of the internet on society, and technology and the environment.

the various sources of energy; understand the impact of the machines on the environment (e.g., noise and pollution). **Unit # 3:** knowledge of the types and names of different tools and how to use them; different uses for tools in different professions; how to maintain, dismantle and build different objects; design or draw the machine parts that the student dismantled using the experience he/she gained from the first unit. **Unit # 4:** learn the history, function, components, and of computers, their structure and main components, and how to start, log onto, and use basic computer functions	(directory/sub-directory), working with files and directories; searching and drawing.	possessing, how to use MS Word generally and in Arabic		

The MoEHE has made an effort to ensure that information technology is available in the school system, but resources are scarce and the computer laboratories are not keeping pace with increases in the student population. Each computer lab has the following requirements:[19]

> Of 1,497 government schools, 1,195 (80%) include technology as a subject, but only 617 have computer labs. The MoEHE five-year plan called for adding approximately 50 computer labs each year – simply insufficient to met the needs of rapidly expanding student body.
>
> Ministry of Education and Higher Education, 2004

- a separate room about $48m^2$ with consistent electricity;
- 10-20 personal computers and computer tables in each laboratory; and
- 20-40 chairs.

In addition to the 617 computer labs, 602 schools have between one and nine personal computers but no laboratory, and 278 schools have no personal computers. The ratio of students to computers is 102:1.[20] There are significant differences in availability of computer labs by Directorate, as Table 5 shows:

[19] Ministry of Education and Higher Education. (2004). Unpublished data.
[20] Ministry of Education and Higher Education. (2004). Unpublished data.

Table 5: Distribution of Computer Laboratories by Directorate

Directorate	# Schools	# Computer Labs	Percentage
Jericho	15	11	73.3%
Gaza	117	71	60.7%
Jerusalem	31	18	58.1%
Rafah	25	14	56%
N. Gaza	60	32	53.3%
Khan Younis	80	39	48.8%
Ramallah	140	60	42.9%
Qalqilia	61	26	42.6%
Bethlehem	83	34	41%
Qabatia	91	37	40.1%
Al Ram	48	19	39.6%
Salfit	51	20	39.2%
Jeneen	92	33	35.9%
Nablus	183	62	33.9%
Hebron	186	63	33.9%
S. Hebron	140	47	33.6%
Tulkaram	94	31	33%
Total	1497	617	41.2%

Source: Ministry of Education and Higher Education (2004)

According to the 2003 UNDP report on *Information and Communication Technology as an Enabler of the Development Process in the West Bank and Gaza*, at least as of 2003 there was "no integrated plan for the implementation of [information technology] within high schools" in spite of encouragement in that direction.[21]

3.3 Higher Education

The Palestinian higher education system faces three main issues: (a) structural deficiencies due in part to rapid expansion of the student body; (b) the precarious financial situation; and (c) deterioration in the quality of education. The higher education system expanded rapidly over the past 10 years. From 1995-1996 to 2002-2003 the number of students more than tripled from about 33,000 to about 120,000; the gross enrollment rate in higher education grew from 10.2 percent in 1995 to almost 17 percent in 1999, and was estimated to be more than 23 percent in 2003.

Notably for ICT, much of the increase is attributed to the rapid expansion of Al-Quds Open University, which is based mostly on distance learning. Most universities that have traditional classroom-based education have exhausted their expansion capacity and are not in a position to meet the demand from an increasing number of secondary school students. Nor are they in a

[21] United Nations Development Program. (2003). Information and Communication Technology As an Enabler of the Development Process in the West Bank and Gaza. Jerusalem: UNDP: Programme of Assistance to the Palestinian People, p. 31.

position to either use ICT to meet increasing demands for higher education in the context of a situation that impedes access to higher education, or to support the development of ICT capacity. According to a World Bank report, the new applied programs at the university level "were implemented through a series of phases...a general level of applied departments (e.g., in the case of engineering, civil and architectural engineering), followed by the creation of more specific departments (electrical, chemical, electrical engineering)." [22] As of 2003, just over 8 percent of courses in higher education institutions related to IT, and these courses were "confined to the traditional areas of computer science and engineering." IT is not generally integrated into other related courses, and universities do not have IT requirements for non-IT specialty graduates.[23]

The UNDP, in its 2003 report on IT in Palestine, cited the following reasons for this lack of attention to IT in Palestinian universities: [24]

- limited capacity of the educational institutions (facilities, funds and teachers);
- underutilization of facilities (e.g., computer labs often not open after 3:00 p.m.);
- the weak linkage between educational planning at the university level and changing labor market demand;
- lack of accessibility and support for IT tools;
- lack of staff development funds;
- lack of real-world experience;
- lack of business incentives and ties with the private sector;
- a rigid academic system that focuses on academic titles and salary scales instead of offering incentives for innovation; and
- the lack of general funds.

Interestingly, the UNDP did not cite as a factor the curfews and closures, which severely limit access to the university facilities.

3.4 Informal and Vocational Education and Training

Informal education in the WBG includes primarily literacy education and job-based skills development offered primarily at the job site and in sheltered workshop (often associated with rehabilitation programs).

Both the MoEHE and the Ministry of Labor (MoL) operate a variety of technical and vocational training programs associated with the social assistance programs; 23 community colleges have some type of post-tawjihi educational programs; and, for nearly 20 years there have been hundreds of training institutions engaged in vocational education and training. One of the important focuses of these programs has been on integration of persons with disabilities,

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[22] World Bank. (2004). West Bank and Gaza Higher Education Project. Preparation Mission Aide-Memoire, p. 13.

[23] United Nations Development Program. (2003). Information and Communication Technology As an Enabler of the Development Process in the West Bank and Gaza. Jerusalem: UNDP: Programme of Assistance to the Palestinian People, p. 31 and 33.

[24] United Nations Development Program. (2003). Information and Communication Technology As an Enabler of the Development Process in the West Bank and Gaza. Jerusalem: UNDP: Programme of Assistance to the Palestinian People, pp. 32 and 33-34.

including but not limited to those suffering from conflict-related trauma.[25] Unfortunately, as in other Arab countries, vocational education and training does not have a positive reputation in Palestine. One reason is common to other countries (being considered an option for students with inadequate academic potential); the other is unique to Palestine: it has been considered a training ground for low-skilled Palestinian workers for Israel.[26]

There are three levels of vocational education in Palestine: secondary schools (more than 2,200 students were enrolled in these schools in 1997-1998), community colleges (1,200 students were enrolled in commercial specialties in 1999-2000), and the non-formal sector. The first two have some degree of regulation and supervision in terms of quality of education and course materials by the MoEHE; the non-formal sector, which is run largely by the UNRWA and NGOs, has virtually no overall supervisory body. As a result, the MoEHE and Ministry of Labor are now coordinating efforts to implement a national strategy for vocational education. With the introduction of the technology curriculum to grades 5-9 there is now a basic academic curriculum in IT at the primary and secondary school levels. This is a major advance with potential impact on post-*tawjihi* training in vocational education. Unfortunately, unlike other countries, there is scarce information regarding technology education/training in Palestinian vocational training and secondary schools. Moreover, although there is training in Microsoft Office applications in NGOs, there are no national standards that apply to these fragmented programs and no external evaluations of the IT skill levels of the students.[27]

The MoEHE has undertaken substantial efforts to reach its goal of 100 percent literacy.[28] As part of those efforts, it has developed a variety of adult and continuous education programs, and co-sponsors or seeks to facilitate adult literacy programs offered through a wide range of venues by NGOs and employers. Literacy is also a focus of both informal and formal early childhood development/education centers. While there have been no specific studies of the relative cost-effectiveness and long term impact of these programs, high literacy rates generally are correlated with improved health status, employability, and life skills. The most recent study of adult literacy found that it was 89.2 percent in 2001,[29] although there are reports that it has declined subsequently in part because of the lack of geographic access to educational and training opportunities resulting from the barrier wall, checkpoints, and other impediments to free movement.

3.5 Special Education

While special education has been a concern in Palestine for more than 20 years and special education programs have proliferated, they are largely operated by relatively small NGOs. They

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[25] Eid-Alldrege, 2003, cited in: Jillson, IA.(2004) West Bank and Gaza: Framework for a Medium Term Social Development Plan, 2005-07. Report Prepared for the World Bank. Bethesda, MD: Policy Research Incorporated.
[26] Management Consulting Services. (2001). Information Technology Human Resource in Palestine. Virginia: Development Alternatives, Inc.
[27] United Nations Development Program. (2003). Information and Communication Technology As an Enabler of the Development Process in the West Bank and Gaza. Jerusalem: UNDP: Programme of Assistance to the Palestinian People, p. 31.
[28] The 1997 Census found that 11.6 percent of the population in the West Bank and Gaza are illiterate.
[29] Birzeit University. (2002). Palestine Human Development Report 2002. Ramallah, Occupied Palestinian Territory.

are fragmented, with virtually no standards and only informal linkages with the education and health sectors. Although there are no national prevalence estimates of learning disabilities, whether or not related to DSM-IV conditions, the demand for such services far exceeds current capacity. Attention to early childhood development in general and to learning disabilities that may be related to parental or other circumstances (e.g., parental substance abuse, exposure to environmental violence) has led to a significant expansion of preventive and early intervention programs, some of which are linked to special education in public school systems. Interest in ensuring that persons with disabilities can continue to contribute productively to their communities has resulted in improved mechanisms for on-going support for retraining – special education – of the disabled individual, and also for counseling of other employees in the workplace to understand how best to accept and work collaboratively with disabled co-workers.

As critical as this segment of education is for Palestinian development, as with ECE there have been no studies of the use of ICT in special education.

3.6 Use of ICT in Educational and Training Programs

Warschauer suggests that an understanding of the resources capacity of Palestine will require an assessment of the physical, digital and human resources capacity of the country. With respect to the latter, the synergy is clear: on the one hand, ICT is "used to promote human capital ... [and] ... a certain amount of human capital, including reading and writing ability, language ability ... and skill with computers is required to effectively use ICTs."[30] The ability of the Palestinian educational system to contribute to development of human capital to support ICT is dependent on:[31]

- the physical inventory of new technologies in schools;
- the types of technology that students and teachers are able to access inside and outside of school;
- the ways that new technologies are integrated into curricula; and
- the knowledge, skills, an attitudes toward ICT that students and teachers have.

[30] Warschauer, M. (2004). Assessing the Human and Social Capital Dimensions of ICT in Palestine: A Conceptual and Methodological Framework.
[31] Warschauer, M. (2004). Assessing the Human and Social Capital Dimensions of ICT in Palestine: A Conceptual and Methodological Framework.

Table 6: Main Features of ICT Use within the Various Levels of the Education System

General Academic Education	Technical & Vocational Education & Training	University Education
There is currently no integrated plan for the implementation of IT within high schools. A new technology subject was introduced to secondary schools	There is almost no IT component in general offerings within the vocational training and vocational secondary levels, although a better situation exists in community colleges. There are very limited offerings in IT-related training within other programs. There is a large number of short-term programs in Microsoft Office applications offered in private, charitable, and NGOs, but these are not standardized.	Only 8.13 percent of courses in higher education institutions are related to IT. There are a limited number of students, and the programs offered are confined to the traditional areas of computer science and engineering. There is an under-utilization of facilities (for example, computer labs are generally not open after 3 p.m. and most staff are not offered e-mail/Internet access from home)
There are three important components of the new Palestinian curriculum. There is a technology and computer component, English will be taught from 1st grade, and there is a focus on computer-assisted learning in all subject areas. Teaching methods in schools are very traditional, focusing on rote learning rather than encouraging skills such as problem solving, creative thinking, analytical skills, and team-work. Testing methods reinforce this focus by examining how well students can remember rather than what they understand or how they think.	Technical and vocational education and training does not promote the necessary thinking skills required of the 21st century, relying instead upon traditional teaching methods. In addition, the curriculum is often too broad to produce skilled workers. However, the proposed changes to the technical and vocational education and training system include changing the curriculum and teaching methodology to encourage problem solving and analytical skills.	Although some of the curriculum is of good quality, there is a slow administrative process in terms of modernizing programs. As with all levels of the educational system, methodology tends to focus on rote learning rather than independent learning, and levels of English competency are low.
Generally, teaching staff are under-trained and IT knowledge is particularly weak.	Trainers and administrators are under-trained and IT knowledge is also weak.	The non-IT-related streams in higher education generally have a low level of IT literacy and do not integrate IT into course material. There are no minimum IT requirements for graduates within these

		courses. Reinforcing this characteristic is the low level of IT literacy among faculty. Trainers and faculty at higher education institutions are unable to use modern IT tools and methods and lack knowledge in computer-related instruction.
The Ministry of Education inherited an approach of placing computers (13 or so) within individual high schools to teach computer programming (the same concept as 20 years ago). Out of 1,200 schools, 350 have computers, from 486 to Pentium 2.	The physical resources within the technical and vocational education and training sector are inadequate. There is a severe lack of modern equipment and training facilities	The quantity and quality of physical resources within higher education institutions vary, but generally there are few computer labs and few computers available for use. Most universities lack operating revenues and a budget for maintaining and upgrading resources. There are limited support personnel and an under-utilization of facilities and resources after hours.

Source: United Nations Development Program (2003), pp. 48-49.

4. OUTLOOK FOR USE OF ICT IN HUMAN CAPITAL FORMATION IN PALESTINE

4.1 Potential for Building on Palestinian Strengths

> "The Middle East was once home to the world's most advanced societies, its people skilled at mathematics, astronomy, science and medicine...the region is again becoming more closely integrated with the global economy...and the spread of information and communication technology (ICT) continues to spur economic development."
>
> Burkhart and Older, 2003

Since prior to the first *intifada* in the late 1980s – at the dawn of the modern ICT revolution – Palestinians have been engaged in the use and development of ICT technologies. This is true notwithstanding the extraordinary difficulties under which the population was living, and the impediments to such involvement in ICT technology. Indeed, the opposite is true: Palestinians who were using or developing such technologies often did so as a means of maintaining their intellectual interests and capacities under the circumstances of often long-term curfews and closures. This was in addition to the use and/or development that related directly to their respective roles in education, health, or other areas of development. Growth and development of ICT in any nation state requires funding and technological infrastructure, to be sure, and this is in short supply in Palestine.

However, development of ICT also requires a commitment at the highest levels of the public sector to ICT and its broad-based use throughout the population and across sectors, partnerships between the public and private sectors, and, finally, and perhaps most importantly, interest in both personal knowledge building and societal capacity building on the part of the population. Palestine, as has been noted previously in this report, has a long history of dedication to education and to learning generally – this may be the most important strength on which to build enhanced ICT in the country. It also will support attainment of the linked goals of the MoEHE, which are based on the premise of linked human capital formation and economic development.

Additional strengths on which ICT can be further developed include: 1) previous investments by the PA and donors in capacity-building, including short-term training, physical infrastructure, and ICT technology distribution; 2) continued keen donor interest in ICT development on the part of donors; 3) the fact that, in spite of considerable destruction of infrastructure over the past several years, there remains a base of such infrastructure on which to build expanded ICT; and 4) creative use of ICT that has flourished in the past four years, as a means of overcoming closures. curfews and geographic isolation.

4.2 Barriers to Development of the ICT Sector in Palestine

The two most important barriers to development of the ICT sector are actions on the part of the Israeli government, and the paucity of funds to invest in ICT. These are briefly highlighted.

Israeli Action. In addition to insufficient financial investment on the part of the PA and donors, the most significant barrier to strengthening the ICT sector has been the continual expansion of the Israeli policies of closure, curfews, and geographic isolation. The PA Ministry of Telecommunication and Information Technology described several ways in which these policies had an impact on the telecommunications sector in Palestine. These included:[32]

- control over the Palestinian frequency spectrum;
- prevention of importing and releasing goods and equipment to develop the information technology and telecommunications networks, including for example confiscation of telecommunications equipment destined for Palestine;
- Israeli refusal to allow linking the occupied areas of Jerusalem to the Palestinian network, preventing the separation of the Palestinian network from the Israeli one and denial of approval for planned fiber optics network through Jordan and Egypt; and
- prevention of direct access from the Palestinian network to the international network, in spite of signed accords with Israel as well as the resolutions and recommendations of the International Telecommunication Union to designate the Palestinian country code 970.

Destruction of ICT infrastructure by the Israeli government since 2001 has also impeded ICT development over the past several years. During the first quarter of 2002, for example, Israeli forces vandalized public, civil society, NGO and university premises, confiscated computer memories, hard disks and equipment, and destroyed communication towers, public and private radio and television station transmitters and studio equipment, and destroyed communication and electricity poles and towers.[33] The army occupied Jawwal's offices and fired at the transmitters' antennae. Its forces completely destroyed some operational communication exchanges. In addition, they occupied the offices of the Ministry of Communications twice, destroying their contents including their entire facilities and equipment. They also ransacked and damaged all the incoming postal parcels arriving from all over the world. Israeli forces also destroyed the Voice of Palestine radio broadcasting station (previously known as Near East Radio), one of the oldest radio stations in the world, and station's antenna tower.[34]

The impact of Israeli policies on ICT development – and development generally – in Palestine cannot be overestimated. Consistently, research has identified public policy and enabling factors for ICT as crucial for development, dissemination, and effective use of this technology.[35] As the controlling power with the ability to control virtually all aspects of Palestinian life, Israel has, *de facto* – if not *de jure* – the ability to foster ICT in Palestine. As we have seen, ICT is even more imperative in a country where a large proportion of geographic areas and populations are isolated by political action of Israel as an occupying power. Unfortunately, as this paper describes, Israel has chosen not to enable this development.

[32] Palestinian National Authority. (2003). Palestinian Telecommunications and Information Technology: Palestine Paper for the World Summit on the Information Society. Ramallah, Ministry of Telecommunication and Information Technology, p. 8.
[33] Palestinian National Authority. (2003). Palestinian Telecommunications and Information Technology: Palestine Paper for the World Summit on the Information Society. Ramallah, Ministry of Telecommunication and Information Technology, p. 8.
[34] Palestinian National Authority. (2003). Palestinian Telecommunications and Information Technology: Palestine Paper for the World Summit on the Information Society. Ramallah, Ministry of Telecommunication and Information Technology, p. 8.
[35] See, for example, Burkhart, G.E. and Older, S. (2003). The Information Revolution in the Middle East and North Africa. Santa Monica, CA: RAND.

Financing ICT in the Context of Diminished Resources for Education. Financing strengthened ICT in the Palestinian educational system is a significant barrier, and considering educational financing generally is instructive. In 2003, annual per student annual recurrent costs were US$292, calculated based on MoEHE data and the total number of general students in 2003-2004. If one applies the 2003 MoEHE estimate of per student recurrent costs to future generations of students, the estimated increase of 55,000 to 75,000 students over the next three years (see calculations above) would correspond to an additional US$16-$22 million increase in operating costs, in addition to investment costs of up to US$46-$60 million. Thus, the cost increases due to the rising number of students could add up to more than US$62-$82 million over the next three years. Given the current economic crisis, it seems very unlikely that the PA will be able to finance such amounts. As a result, either the quality of education would decline, or significant efficiency gains would have to be realized for the PA to be able to meet the rising demand for general education. Some cost-saving measures have already been implemented, but financial sustainability remains a serious challenge for the PA in the education sector. Ministry of Finance (MOF) data indicate that total expenditures for general education (K-12, not including higher education and other educational programs) amounted to US$193 million, corresponding to about 17 percent of the total PA budget in 2003, while MoEHE data indicate that operating costs alone were US$206 million that year.

UNRWA, which currently provides schooling for approximately 30 percent of all general education students, faces considerable financial sustainability problems if its budgets do not increase in line with population growth. Given the already high rate of double shifts in the existing schools, UNRWA will find it increasingly difficult to accommodate the demand for basic education for the growing numbers of refugee children. It is virtually impossible for UNRWA to meet the ICT needs of its teaching faculty and student population.

Accurate estimates of *total* expenditures on general education are not available. Data from the MOF include only the funds that are channeled through that Ministry, and exclude the large amounts of donor assistance going directly to the MoEHE. Furthermore, since direct donor assistance tends be through projects, expenditures financed under those projects are not recorded in the overall MoEHE accounts. Therefore, it is impossible to obtain complete expenditure information from either the MOF or the MoEHE. MoEHE statistics show that the major beneficiary areas for donor support are primarily for school construction (39%), higher education (25%), and emergency measures (12%). Notably, none of the recent reports on ICT in Palestine presents data on total budgets for or expenditures in ICT specifically. The MoEHE relies heavily on donor support to complement declining allocations from the MOF. In 2003, the shortfall was fully covered by donors, who provided a total of US$12.3 million in non-salary budgetary support for the MoEHE, of which US$7.6 was through the Emergency Services Support Project. Salaries are transferred directly from the MOF and were also fully covered by donor; again, there are no data specifically to identify expenditures for ICT.

Higher education institutions are facing a critical financial shortfall, raising equity concerns since there is insufficient financial aid to enable students from poor households to continue their studies. Higher education was allocated 5.6 percent of the total education budget, which is among the lowest in the world. The average for MENA countries is around 30 percent and the average for OECD countries is 26.3 percent. The lack of public funding obliges higher education institutions to rely on student fees, which account for 60 percent of university and community colleges operating expenditures. Even though fees are the major source of revenue, they represent one-third of normative costs. Donor support for student aid programs including grants and loans amounted to US$16 million for 2003-2004, and donor support to universities' operating costs was US$7.4 million. Even with this level of donor involvement, there was still a financing gap of US $19.7 million for the sub-sector in 2003. As has been noted previously in the report, there are severe shortages of ICT technology and faculty trained in teaching ICT at the university level.

5. COMMENTARY

Two relatively recent developments lay the groundwork for positive developments in ICT in Palestine: the reunification of the MOE and MoEHE, and increased donor interest in ICT.
The 2003 reunification of the Ministry of Education and Ministry of Higher Education into the MoEHE and the proposed Education Sector Review provide the opportunity to develop an integrated, sector-wide development plan that includes strategic plans for ICT. This would require, however, a well-coordinated, coherent approach among all sub-sectors. This is a challenge since the current management structure of the MoEHE is not as effective as it could be:[36] there are 17 General Directorates (fourth management tier), which are further split into departments and divisions. Furthermore, despite the merger in 2003, some functions are still carried out separately in the General Education and the Higher Education section of the MoEHE. In addition, the administrative split between West Bank and Gaza increases the potential for fragmentation, which could be addressed in part through strategic use of ICT. The MoEHE has expressed specific interest in ICT and its use in the educational system (and in the educational system playing a role in ICT capacity building). An important development would be strengthened cooperation between the MoEHE and the Ministry of Telecommunication and Information Technology, as well as expansion of its linkages with the Ministry of Industry and Labor (for long-term human capacity planning). Specifically regarding ICT, the MoEHE has planned to apply lessons learned from the experience in Ireland to Palestine; that is, to have four objectives related to IT in public schools: 1) to have at least one computer in each school; 2) to ensure that all teachers are literate in information technology; 3) to have computer "licenses" that demonstrate competency in basic computer skills; and 4) to have the business sector partnered with the government generally and with the public school system specifically.

The introduction of technology as a specific subject in grades 5-9, including the development of texts specifically designed to improve students' understanding of the concepts and practical application of technology – and focus on computers and their practical use – is an important advance in the MoEHE's efforts to link education and developments in ICT. It will be important for the MoEHE to evaluate these courses, including an assessment of impact of the courses on students' interest in technology generally and ICT specifically.

There are other examples of increased interest in and support for ICT and education in Palestine. The recently-developed Higher Education Project of the World Bank includes support for quality

[36] *PA: Public Administration and Civil Service Reform Project Inception Report: April 2004*. C3 Consulting – ASI Consortium.

improvement in higher education institutions, including promotion of distance and e-learning, [37] and USAID is planning an expansion of its investments in ICT. An IT needs assessment was to be completed by USAID in late September but is not yet available; it was anticipated this assessment may call for support for increased ICT in the education sector.[38] The ANERA, a US NGO working in Palestine, has initiated a project with private funds to support and facilitate the coordination of the work of Palestinian organizations involved in ICT, including universities. However, for these initiatives to be successful, it is critical that they be coordinated, not duplicative, and that they work to encourage linkages among and between the Palestinian public and private sectors. For example, an important development would be strengthened cooperation between the MoEHE and the Ministry of Telecommunication and Information Technology, as well as expansion of its linkages with the Ministry of Industry and Labor, for long-term human capacity planning.

This report began with a quote from the 2000 Vision Statement issued by the PNA. That statement also included specific recommendations that related broadly to technological development. These are both applicable to and can serve as basis for justification for expanded investments in and strategic plans for ICT in the educational system:[39]

- make a commitment to expanding competitive scientific and technical capacity through enhanced educational opportunities from pre-school through post-graduate education;
- conduct broad-based planning for technological change, linking education, health, industrial, agricultural, environmental and other sectors;
- create technology management systems within and across sectors, to ensure that the development, diffusion and use of equipment and procedures are appropriate and effective;
- support research and development in key areas of competitive advantage; and
- create a climate that encourages private-sector investment in research and development.

Notwithstanding the degree to which these recommendations reflected a rational, indeed, strategic view of the role of technology in socioeconomic development of the nascent Palestinian state, the ensuing reality has decidedly not been an "enabling environment" for ICT. The barriers described in this section intensified in 2005 and there is little possibility of their amelioration in the near future. The Palestinian economic situation is likely to further deteriorate as the political reality – including, for example, movement toward a single state solution on which strategic planning (such as donor assistance planning), is based – remains uncertain. The conundrum is this: at the very juncture in Palestinian development that ICT is most imperative, its strengthening, in particular vis-à-vis the education sector, is less certain. This calls for renewed efforts on the part of those engaged in ICT planning and implementation to seek feasible means of extending the appropriate and effective use of ICT within the context of rapidly changing sociopolitical circumstances.

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[37] World Bank. (2004). West Bank and Gaza Higher Education Project. Preparation Mission Aide-Memoire, p. 5.
[38] World Bank. (2004). West Bank and Gaza Higher Education Project. Preparation Mission Aide-Memoire, p. 10.
[39] Ministry of Planning. (2000). Pathway Toward A Palestinian Vision For 2005 And Beyond: Report Of Progress On The Palestinian Strategic Development Plan. Ramallah, p. 6.

APPENDIX 1: PALESTINIAN PUBLIC AND PRIVATE SECTOR ORGANIZATIONS INVOLVED IN ICT[40]

A. Public Sector

When the Palestinian Authority assumed control in 1994, the public sector became responsible for the development of the Palestinian information society. Consequently the number of different projects offered by the sector increased through direct funding or deployment of donor country funds dedicated towards such development. The public sector's efforts revolve around the following activities:

Ministry of Telecommunications and Information Technology (MoTIT):

The re-organization process of the telecom and information technology sector started once this Ministry was established as part of the Palestinian's National Authority's reform initiatives. MoTIT therefore initiated moves that would regulate the telecom and information technology sectors. These initiatives included measures to update existing laws and the introduction of new laws. The decision of the establishment of a regulatory authority was then taken in order to monitor and regulate the sector's performance. In addition, MoTIT assumed the responsibility for the Government Computer Center (GCC) which was previously managed by the Ministry of Planning and International Cooperation (MOPIC). Upon its establishment, the GCC's main objectives were focused on managing the governmental and ministerial computer network in addition to developing public sector's human resources in accordance with the sector's needs and desired areas of specialization. The Ministry is currently working to list the e-government initiatives on its new strategy plan. It is also moving to adopt the public sector's e-transformation.

National Institute of Information Technology (NIIT): This institute was established by the Palestinian Economic Council for Development and Reconstruction (PECDAR) in order to provide specialized training for all sectors.

Ministry of Labor (MOL): The MOL offers computer training to its technicians and professionals from all disciplines in an effort to strengthen IT integration in different professional sectors.

B. Private Sector

Palestinian Telecommunications Company (PALTEL): The only telecommunication operator in Palestine. It offers land and leased line services within the Palestinian territories in accordance with an exclusive license awarded by the Palestinian National Authority that expires in 2007.

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[40] Palestinian National Authority. (2003). Palestinian Telecommunications and Information Technology: Palestine Paper for the World Summit on the Information Society. Ramallah, Ministry of Telecommunication and Information Technology, p. 8.

Jawwal: The exclusive provider of cellular telecommunications in Palestine. Its support of local community covers the establishment of several computer labs. It also employs a significant number of technical staff specializing in IT and cellular telecommunications.

Software and hardware companies: A significant number of such companies exist in Palestine, some of which are authorized dealers of products of at least 15 international IT and telecommunications companies. A number of software companies play a pivotal role in the revitalization of national economy by providing computer packages in the areas of student registration, management, and training as well as standard and specialized education for people with special needs. The list also includes further packages in the areas of library and archiving systems, GIS, image and document management systems.

Specialized training centers: There are significant numbers of such centers in Palestine. Some centers are linked to international IT companies mainly through training agreements that enable these centers to become certified examination centers offering international certifications.

C. Non-Governmental Sector

The non-governmental sector is one of the main sectors that supports the spread and consolidation of the information society in the Palestinian community. What distinguishes this sector's work is the range of organizations and bodies that fall under its umbrella. These organizations pay great attention to information society projects that deal with development and especially education. Such institutions are:

Universities: Palestinian universities have for a long time been the pioneers in introducing information technology in education. These universities have also been responsible for launching a varied and distinctive range of projects and began attracting donor community interest. In addition, international companies have expressed an interest and some have even signed numerous educational and training agreements with certain universities. Among some of the unique projects are the IT Centers of Excellence. Al Quds University IT Center of Excellence in Abu Deis, Jerusalem, has been completed, and work has begun on an IT Center of Excellence at Hebron University. The Islamic University in Gaza and Al Najah University in Nablus will follow. (These centers are funded by Diaspora Palestinians.) Work has also begun to initiate electronic learning projects, educational gateways and knowledge centers in addition to technical training projects, continuing education programmes, development of public sector human resources and others. The role Palestinian universities play in developing specialized programmes and scientific research in the information society field has rapidly expanded. One of the more important programmes Birzeit University has completed is a database of Palestinian laws all the way from the Ottoman rule, to the British, Egyptian, Jordanian, Israeli and present Palestinian rule. This programme is called Al-Muqtafi. Palestinian universities provide a suitable environment to help blossoming, locally-created information technology.

Palestinian Information Technology Association (PITA): PITA's current membership includes 75 Palestinian IT companies. The Association offers a solid platform for the Palestinian information society by providing training, rehabilitating and marketing. PITA has a commercial representative office based in Dubai Internet City and is tasked with opening the Gulf region to Palestinian IT products.

Palestinian National Internet Naming Authority (PNINA): PNINA was established to administer Palestine's Internet address (.PS). PNINA enjoys representation from the public, private and non-governmental sectors.

Internet Society – Palestine Chapter: ISOC-PS is concerned with spreading Internet culture to Palestinian communities, protecting users, and contributing to the drafting of Information Technology laws.

The Welfare Association: The Welfare Association oversees several international commercial company projects such as Future Kids, Microsoft, CISCO and Intel through their academies and computer training centers for different society sectors, especially those in remote, impoverished and deprived areas in addition to universities, schools and women's centers.

PC & NET 4 All: PC & NET 4 All aims to increase the number of computer users and Internet connectivity in Palestine.

Paltrade: The Palestinian Trade Center concentrates its efforts upon information technology in two ways. First, by reinforcing the understanding of maximum spread of information technology in all sectors of society in what has become known as IT Diffusion. Second, Paltrade markets Palestinian information technology at international exhibitions, or through important strategic planning related to the information technology sector.

IT Special Interest Group (ITSIG): This virtual group was established several years ago by Birzeit University. Not long after its inception it became a centralized think tank for Palestinian information technology professionals and the leading electronic platform for information and opinion exchange and materialization of positions and even revising IT draft laws.

ICT and Education in Palestine:
Social and Educational Inequalities in Access to ICT
A case study approach

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A contribution to the ongoing knowledge building initiative project on the information society in Palestine.

This micro study is part of a project dealing with the role of information and communication technology in Palestine and funded by the International Development Research Centre, Ottawa.

Table of Contents

Abstract

In this study I will focus on the worldwide debate about the growing gap between the information-rich and the information-poor, what is usually referred to as the "digital divide". I will argue that such challenges need to be taken into account in the attempts of integrating Information and Communication Technology (ICT) in the Palestinian educational system. Through a case study approach at a micro-level, I will analyze a number of cases that involve students and teachers in public, private and UNRWA schools in the West Bank, divided according to gender, socio-economic status, and geographic distribution (village/urban, refugee camp/city). The study involves site visits, classroom observations, focus groups and interviews with teachers, students, parents, and stakeholders focusing on the Internet as an important component of ICT. From the data gathered, I will elicit information on different uses of ICT by teachers and students, and the contribution of teachers' pedagogy in ICT classrooms on social and economical inequalities and the "digital divide".

Furthermore, this study will focus in particular on issues of access given the socio-economic context of cultural and economical inequalities. The study is a component of the ongoing knowledge building initiative project on the information society in Palestine.

According to this project document, no systematic research or documentation has yet been undertaken on the notion that the "ICT diffusion among Palestinian regions and communities has been uneven, and in some geographical areas, communities and women as whole category being strongly disadvantaged".

Introduction

There are currently approximately one million students enrolled in the Palestinian educational system; 90 percent of whom are enrolled in the basic education sector. ICT advocates in Palestine, based on worldwide literature, believe that ICT can play a critical role in enabling the educational system to better meet the developmental needs of the Palestinian society. Accordingly, the Palestinian Ministry of Education and Higher Education (MoEHE) took measures to ensure the accessibility of Information and Communication Technology (ICT) in schools through building more computer labs, more connection to the Internet, introducing new technology curriculum which addresses many ICT topics throughout grades 5 to 10, and introducing English from grade 1 in hopes of facilitating ICT teaching and learning. According to the MOE reports, 40 percent of the schools (2109) house computer labs (13 computers in each lab), while a small percentage of these labs are connected to the Internet.

The new technology curriculum developed by the Palestinian Curriculum Development Center starting in 2000 culminated in the creation of separate subject textbooks for grades 5 to 10 to be taught for one to two classes (45 90 minutes) per week depending on the level. Twenty percent of the technology curriculum subjects is concerned with general computer skills (i.e., how to use Windows and office software), while programming skills (i.e., C+, Visual Basic, algorithms, Internet, networking, multimedia, website design, database design and computer maintenance) are all planned for higher levels starting from grade 11 to 12 through similar textbooks yet to be published.

According to the Ministry of Education and Higher Education (MoEHE) survey of 1586 teachers who teach the technology curriculum (MoEHE, 2004), 30 percent of the teachers who teach technology have a computer science background. An additional 18 percent are specialized in mathematics, and 35 percent are specialized in natural sciences (i.e., general science, chemistry, biology, and physics) since the technology curriculum also contains scientific and engineering subjects.

Concerning the Internet connections in Palestinian schools, and according to the Directorate General of Educational Technology and Information, only 21 Palestinian schools have their computer labs connected to the Internet. Although the MoEHE permits the internal network to be built from the school or the MoEHE budget, the Internet line connection process is treated differently. Interviews with stakeholders and administrators in the MoEHE revealed that in order for a school to connect its computer labs to the Internet, it should seek donations from the local community or the parents' associations (PTAs) and the connection should be registered under the funder's name, as an attempt to enhance the involvement of the local community in the educational process. On the other hand, interviews with officials in the United Nation Relief and Work Agency (UNRWA) that are responsible for nearly 25 percent of the Palestinian schools in the refugee camps, revealed that the UNRWA headquarter does not allow its computer lab to be connected to the Internet, citing financial reasons.

Unfortunately, there is no integrated plan for the implementation of ICT within the Palestinian General Education system. It is expected that the number of computers in the school will increase rapidly due to their low costs and the support of the local and the international community to the ICT sector. Taking into consideration all these factors, together with the high costs of the Internet connection, it is now becoming vital to consider the social and the economical consequences of the rapid integration of ICT in the Palestinian education sector and its effect on educational, social and gender inequalities. In this study, I will discuss the following questions: How is ICT introduced in the Palestinian schools? How do the curriculum and the textbooks introduce ICT? How is it translated into classroom practices? What kinds of pedagogy patterns are used by teachers using ICT? In what subjects do teachers mostly use ICT? How do the teachers' epistemological beliefs affect their ICT classroom practices? What kinds of ICT teachers' training programs are introduced in the educational system? Are there differences in access related to gender and socio-economic status? How do parents perceive ICT? What kinds of ICT related activities do students practice outside the schools?

I will try to answer such questions and others through analyzing a number of cases that involve students and teachers in public, private and UNRWA schools in the West Bank, at a micro-level approach. The study will involve site visits, classroom observations, focus groups, and interviews with teachers, students, and parents focusing on the Internet as an important component of ICT.

Answering the questions posed above in the context of the Palestinian educational system is essential, especially in light of the international studies' results that suggest that ICT technology acquisition and use in the educational system may reinforce inequality in education in spite of the advantages of such integration.

In the following paragraph, I will explore some of the international studies concerned with the integration of ICT (i.e., computers and Internet connection) in the educational system.

ICT and Education: The International Experiment

Billions of dollars have been spent on ICT in schools worldwide with the expectation that the information and communication resources this technology may provide will improve educational outcomes. The major function of ICT according to many scholars is to support learning through tutoring, exploring, creating, composing, storing, and analyzing data, and is considered as a means for communicating with others. According to other scholars, ICT can encourage an approach that stresses problem solving, teamwork, and effective communication, and can provide students with the technical skills necessary for future employment (UNDP Strategic Framework, 2003; Feldman, Konold & Coulter, 2000; Berenfeld, 1996). ICT, according to the UNESCO report, can change the teachers' role from one that is considered the owner and transmitter of knowledge to a more facilitating, supporting, and a continuous learning role (UNESCO, 2002). Many see ICT as having a potential for improving schools, developing the educational programs, promoting interdisciplinary work, connecting students to the real world through collaborative projects, and sharing the products of their work with diverse audience outside the school. Such changes are consistent with the kinds of educational reform that many have called for over the past decade or more (Means et al., 1993).

Although some research suggests a substantial change in education from ICT integration in schools, the documented impact of ICT in schools is still far from revolutionary. According to Schofield and Davidson (2002), factors like attitudes and expectations; technical knowledge; school, classroom, and community culture; and curriculum design and implementation all affect the Internet access flow of benefits. For example, Richards (2004) elucidated how ICT integration into formal contexts dominated by "traditional transmission models of learning" such as in Singapore and Hong Kong resulted in dilemmas and tension in the ICT pedagogical level. ICT integration in such a context, according to the study, is considered a threat to teachers' authority in the classroom. Unless the school culture goes beyond the traditional authoritarian top-down approach, to more dialogical, convergent culture, ICT impact will be limited.

On the pedagogical level, Becker (2001) focused on the teachers and their teaching practices in order to highlight some important differences in computer use patterns. In particular, the study concentrated on the frequent use of computers by teachers relating to subject matter, numbers of computers available in the school, teachers' professional qualification and their conceptions of their role, students' socio-economic backgrounds, students ability, and teachers' philosophies and beliefs. The results showed that different subject matter teachers' use of computers during class time appear to be affected by the teachers' general philosophy, that is, their understanding about teaching and learning. Teachers with the most constructivist teaching philosophies are stronger users of computers: they use computers more frequently, and in more challenging ways, and encourage students to use computers in their work. This also depends on other factors, such as the subject matter, teachers' expertise, and computer availability in the classroom.

On the macro level, the optimistic expectation that ICT integration in schools could provide equal educational opportunities has recently been under question. On the contrary, results of recent critical studies have shown that technology acquisition and use in the educational system may reinforce inequality in education.

Relating to computers, for example, many studies have shown that those students from low socio-economic backgrounds use computers in quite different ways than those from privileged backgrounds. According to Apple (1986, 1998), pedagogies that stress integration of computers in subject matter, programming skills, and higher thinking skills, are more prevalent in middle-class schools, while low level, technical uses of computers dominate the working-class schools. This issue, according to Apple and others, re-enforces class divisions and increases socio-economic imbalances (Apple, 1998; Campbell, 1984; Becker & Sterling, 1987)

Other studies show that equal access to ICT, without attention to socio-economic status, and "cultural capital" of families and students (Bourdieu, 1990) will contribute to the "digital divide" and increase the social and educational inequities. In a study for Angus, Snyder, & Sutherland-Smith (2004), four previously ICT disadvantaged family members were provided with "equal access to ICT" and their engagement with ICT was examined. The study shows that the families that encouraged their preschool children to do "school-like activities" (e.g., searching educational sites, writing stories, practicing spelling, etc.) provided their children with a "cultural capital" different from the "cultural capital" the other families provided by permitting their children to be involved in un-school-like activities (e.g., chatting, downloading music, reading celebrity news, visiting magazine and fan sites, etc.) The former children were more successful in meeting school requirements, and thus were more advantaged than the latter children. The study concluded that the previously disadvantaged family members were not advantaged by their access to ICT due to the "cultural capital": "The question is about not only who gets how much of the technological resources but also who gets the benefits associated with such resources and how much of them" (Angus et al., 2004, p. 16). The study also suggests that there must be a reconceptualization of the word "access" to include much more complex and multilevel social goals.

Similar research (Attewell and Battle, 1999) suggests that, when other factors are controlled, having a computer at home has relatively little impact on the school performance of poor and minority students, although it is associated with marked positive effects on the performance of students from homes of higher socio-economic levels.

There is considerable lack of clarity about the actual change that ICT integration processes have in education and how Internet use is likely to influence Palestinian students and teachers. In this micro-level study, I examine the impact of the ICT integration process on the Palestinian schools by concentrating on Internet access. Because of the substantial cost of providing Internet access in classrooms, understanding its impact on classrooms, teachers, and students seems essential. I argue that the worldwide debate about the "digital divide" (i.e., the growing gap between the information-rich and the information-poor) has to be taken into account in the attempts of integrating ICT in the Palestinian educational system.

Methodology

The nine Palestinian schools that were my focus in this study were:

1. Al-Hashemiyeh Boys School (Ramallah city/governmental)
2. Banat Ramallah Girls School (Ramallah city/governmental)

3. Turmos Aya Boys School (Turmos Aya village/governmental)
4. Turmos Aya Girls School (Turmos Aya village/governmental)
5. Balatah Elementary Boys School (Balata Camp-Nablus/UNRWA)
6. Balatah Elementary Girls School (Balata Camp-Nablus/UNRWA)
7. Al-Amari Elementary Boys School (Al-Amar Camp-Ramallah/UNRWA)
8. Al-Amari Elementary Girls School (Al-Amari Camp-Ramallah/UNRWA)
9. Friends Boys School (Al-Bireh-Ramallah/Private)

My target groups in these schools were the teachers, the students (grades 9 and 10) and their families, and the principals. The qualitative part of the study was represented by conducting interviews, focus groups, and classroom observations with the target group. The quantitative part of the study was the distribution of a questionnaire developed for the teachers and students in grades 9 and 10 to cover issues about their use of computers and the Internet if available, and their attitudes and beliefs about the Internet in general, taking into consideration factors such school type, gender and socio-economic status. More specifically, the themes that were explored in the focus groups, the interviews, and the questionnaires were:

- General familiarity with and knowledge about ICT
- Places of access to ICT and time spent using computers and ICT
- How computers and ICT are used in the schools and at home by the teachers and by the students in terms of:
    - Educational communication, chatting, group discussion and forums
    - Searching for information (lesson plans, activities, database, etc.)
    - Projects on school web, multimedia
    - Shopping
    - News and politics
    - Entertainment
- Obstacles in using ICT in education (teaching and learning) (i.e., infrastructure, costs, language, knowledge and training, security of information, etc.)
- Advantages of integrating ICT in schools and homes (networking, contacting friends, families, etc.)

After acquiring official permission from the concerned parties (i.e., the Ministry of Education and the UNRWA), my first destination was the school principals in order to have more information about the ICT conditions in these schools. After that, I conducted semi-structured interviews with the technology teachers in each school, asking them about the themes mentioned above. From the technology teachers' interviews, I built the questionnaire and distributed it to the teachers and to the grades 9 and 10 students in each school. There were 132 questionnaires completed by the teachers and 582 questionnaires completed by the students.

After that, I conducted focus groups with teachers and students as follows:

a. In each school, two focus groups were held with teachers: one with teachers who use the internet frequently (5-7 teachers), and the other with low-level and non-users of the Internet (5-7 teachers).

b. In each school, two focus groups were held with students: one with students who use the Internet frequently (6-8 students), and the other with low-level and non-users of the Internet (6-8 students).
c. Two classroom observations were held in each school.
d. Two focus groups with were held with the families (at Turmos Aya schools).

The sources and types of data (the interviews and the focus groups, the observations, and the questionnaire) allowed for triangulation of data. I concentrated on the following general themes from the cases (in the nine schools): the reality of ICT in the targeted schools, the role of the teachers and the parents (teachers' beliefs and practices, family beliefs about the ICT), the role of the community, and the role of the curriculum. I took into consideration the following factors in my analysis of the above themes: gender issues affecting ICT, geographical issues affecting access to ICT, and socio-economic issues.

The Case of Turmos Aya Schools: The Girls School

Turmos Aya Secondary Girls School is a governmental school from grade 5 to 12, with 25 female teachers and 490 students. The school is located at the center of the village of Turmos Aya, a wealthy village whose people are land owners. Most residents work in business and commerce in the United States and in Latin America.

According to the principal, Abla, the computer lab is new, and was built with the contributions and donations from the local community. It contains 23 computers; four of them are Pentium IV while the rest are Pentium II. Abla is used to seeking donations from the Parent-Teacher Association (PTA) and from the Turmos Aya families who live abroad, and has even traveled several times to the USA in attempts to gather donations from difference sources. Through these trips, she managed to buy a photocopier, several new computers, and an LCD for the computer lab.

The teachers in that school were subjected to one intensive computer literacy training course in 2000, but according to Abla, most of them forgot the basics because of lack of practice.

Fatima, the technology teacher, invited me to the computer lab during the break, where I noticed a few students trying to print some documents before the bell rang. They were members of the newly established computer club, the committee of which consists of six students. One of its responsibilities is to follow up the schools' cultural and religious activities by printing information about the holidays and other cultural issues and distribute them among the students. They are also responsible for helping other students with their homework by finding materials from educational CDs, and for making PowerPoint presentations.

According to Fatima, the new technology curriculum has a beneficial impact on the students. As she explained: "they became computer literate, but still one period a week for the technology curriculum is not enough, there is no time for the students to accomplish in 45 minutes period."

The computer lab contains an internal network from the MoEHE. The PTA, with the help of the local community, agreed to pay for an Internet dial-up line to connect the lab with the Internet. According the principal, the MoEHE does not allow the governmental schools to connect to the Internet using the school's budget. This was confirmed by the MoEHE official, who claimed that it is one way to enhance the contribution of the local community. Furthermore, the Internet line (dial-up phone line) must be registered under the name of the owner, not under the MoEHE. The lab is still not connected to the Internet, and Abla blames the bureaucratic measures of the MoEHE for this delay.

The teachers in this school live in the village and villages near by, such as Abu Flah and Kufor Malik. The results of the questionnaire confirm that 8 out of 25 teachers use the computer in the school.

The data from the focus group with the school's teachers indicate that they have good computer skills. They use the computer for data storage, making lesson plans, writing quizzes and tests, and filling a ready-made program for their schedule and for the grades. The teachers also expressed the importance of the Internet in education. The data from the questionnaire indicated that 13 of the teachers have a computer at home, 7 of whom also have an Internet connection at home. They use the Internet from their homes to find educational website concerning their specialization, and for communicating with their friends and relatives. Even though the cost of the home Internet access is high, the teachers say that the situation would not be better if the school were connected to the Internet. The mathematics teacher explains, "I expect that the principal will put restrictions on the use of the internet as a precaution measure for financial [reasons]."

According to the teachers who participated in the focus group discussion, the main obstacle for using the Internet in teaching is the condensed teaching schedule (i.e., 26 classes per week) and a new crowded curriculum, which leaves no time for them to use the Internet effectively in teaching. When asking them about students' knowledge about the internet, they all said that most of the students have Internet access at home and use it mainly for chatting and playing games. Some of the students use it for doing their assignments and reports, but the teachers expressed reservations about assignments brought from the internet. Most often, some of the teachers ask the students to repeat orally what they have brought from the Internet in front of the class to check if they understand what is written. One of the teachers commented, "I feel more comfortable when I see a handwritten report than a printed one, it is an indication that the student read what he wrote not as those who cut and paste and print from the Internet."

Many students in this school are English-speaking students returning from the USA and Latin America. "The parents prefer to bring their children back to the village before the teenager period, or even when they are little children, so that they grow within the Islamic culture," said the principal. As a result, these children face difficulties at first with those students who have grown up in the village; they also must deal with the Arabic language.

A high percentage of the students have computers and Internet connections at home. The questionnaire results reveal that 70 percent of the students who filled in the questionnaire from grades 9 and 10 have computers at home, and 45 percent of them have Internet access at home. The focus group data indicated that the students use the Internet mostly for communication with there families and friends abroad. One of the students said that the Internet is the easiest and least expensive way to talk to her parents in Panama nearly every day. The students also use the Internet to find resources related to their homework and research projects. For example, the students searched the Internet for subjects like the "Salts of the Dead Sea" and the "Ultra sound", pictures of Palestine for the social science teacher, and pictures of Islamic scholars for the religion class.

Most of the students in the focus group session learned how to use the Internet from their relatives and friends, and some of them by themselves. Grade 9 students learned about the Internet from the curriculum, but the teacher had to teach this lesson theoretically since there was no Internet connection.

According to the students, the high cost of connecting to the Internet is one of the biggest obstacles they face, since the only way to access the Internet is from home. One student said, "there is a 'free hour' from 4-5 when we can use the Internet without charge, but at the same time the lines will be busy since all the people are using the Internet in this hour."

The students see that the Internet time available to them is very limited. They all expressed the frustration that after all the homework and the exams the teachers give, there is no time left for them to use the Internet.

They also explained another obstacle concerning their parents' beliefs about the Internet in general. According to the questionnaire, 50 percent of the students who answered the questionnaire in this school (i.e., 37 out of 71) do not have support from their parents to use the Internet. When I asked the students about their parents' beliefs about the Internet, and their position on their children's use of such a technology, they responded with comments such as:

> *One of the obstacles that I face is that my parents are afraid that we might chat with guys. That's why the Internet is not good for them.* (Nisreen, Grade 9)
>
> *The most things that worry my family are chatting. They hesitated a lot before they brought me the internet.* (Aya, Grade 9)

Parents' beliefs and attitudes towards ICT use in education can be revealed from the focus groups with the parents. Parents talked about their fears of letting their children use the Internet without their censorship. They made comments such as:

> *In the past we used to search for the information from the books, and these days, my sons keep asking money from their father to go to the Internet center and to search for the information but we can't really know what they are doing out there.* (Nahla, mother of two students)
>
> *My kids use the Internet for playing games only. I have a computer at home it is not working but I will not fix it or connect it to the Internet because they will play games and will not study.* (Amer, father of one student)
>
> *We are afraid from the western culture to sneak into our kids' minds as a result of their Internet access.* (Hana, mother of one student)
>
> *My husband brought a computer to the children and connected it to the Internet, but when the children started to use it for chatting, we disconnected it at once.* (Suha, mother of two students)
>
> *I do not encourage my kids to go to the Internet centers, I'm against the use of the Internet, this generation is bad and I'm afraid that my kids will do bad things.* (Nafez, father of one student)
>
> *We have an Internet at home, and my son uses it too much. Once the bill came with calls made at 4:00 am in the morning, and I found out that he was chatting with his friends. From one side you should have some sort of censorship on your kids, but this will also create a mistrust between you*

and them. It is a very complicated situation. (Rasheed, father of one student)

Some parents also expressed discontent with the way teachers deal with the information students bring from the Internet.

> *I'm worried when my kid finds the information for his homework from the Internet and just copy and paste without even understanding what is written.* (Mona, mother of two students)
>
> *Honestly I tell my kid that it is a bad way [the Internet] of searching for information, and I advise him to go to the library and know what he is reading. Internet will prevent my kid to think and he will be illiterate.* (Fatima, mother of one student).

The results from the parents' focus groups are consistent with what the students have mentioned in the interview concerning their parents' concerns about the Internet.

The Case of Turmos Aya Boys School

The existence of Internet access at the boys school at Turmos Aya village (24 teachers and 419 students, some of whom are English-speaking) has major effects on students' involvement in ICT. According to Jihad, the computer and technology teacher at the school, the PTA has supported the school with the Internet access and now 21 computers (most of them Pentium III and IV) are connected. A major obstacle is that the Internet line is a dial-up connection type that prevent the students from using the Internet at once in the classroom since the network will be very slow. Another obstacle for Jihad is that he is not allowed to access the Internet for long periods of time because of the high telephone bill charges, and he is afraid that the PTA will change their minds and disconnect the Internet subscription because of the costs.

Jihad tried his best to overcome these obstacles, such as by downloading a proxy server, and buying school net software that he said helped him a lot in instructing. Because of such software, the students – sometimes up to 35 in a class – can watch the teacher's screen from their screen, and to see the instructions he gives. Jihad has also built a website for the school with interactive pages, such as group discussions, forums, etc., to encourage the students to communicate with the teachers and their colleagues.

The students use the computer in the school 45 minutes per week, which is included in the technology curriculum, and only when the unit is about computers or the Internet.

I observed one classroom in the school during my visit. Jihad invited me to the computer lab, where he explained the algorithm for the Visual Basic program and its use in the computer program. It is the first unit in the grade 10 technology curriculum.

The students (36) entered the computer lab and sat into pairs. Jihad started the lesson with some general instructions:

> *Jihad: Now all of you listen to me. Do not play with the keyboards and the mouse, and if you do, you will make a lot of problems to the computer. Just listen to me when I explain and write your notes. Then I will tell you when to start applying. Our lesson is about the Visual Basic and as we took last week about the algorithm, we will apply it in the Visual Basic programming. As I remember we reached page 27, now look at your screen.* [Jihad started the net program so his screen's display appeared on

the screens of the other computers, and the students could just watch what Jihad was doing] ... *now we write down c:* ... ..[Jihad continued in his instruction for about ten minutes, focusing on examples written in the textbook like how to add three numbers and let the answer appear in a specific place using the mathematical algorithm.]
Now take five minutes to apply the same example. [It was obvious that most of the students were struggling to understand the process, and Jihad was watching students' work from his own screen. One of the paired students was working while the other was watching and taking notes, others were just staring at the screen with no reaction, and few were trying look what their neighbors were doing.]
Now I will turn my screen on and start new example, try to finish what you are working on. [After one minute, Jihad used the network again to turn his screen on to the other screens and started to explain the next example from the textbook.]
Jihad: This is very important and will come in the exam so be careful. [I can see obviously the discontent and the worried faces because they were not following up at the moment, they started to talk to each other while the teacher was explaining, trying to ask their friends what to do, and try to write notes, but the teacher was so fast.]
Jihad: Are there any questions, just raise your hand. [A few students raised their hands and they seem to be the only ones that were following along with Jihad.]
[Again Jihad turned on his screen and started another example until the bell rang. He asked the students while they were getting out of their places to do the homework.]
Student: We don't have the Visual Basic program, from where do we get it?
Jihad: You may buy it and if not you may use the Excel program, there is Visual Basic in it. [The students left for their next period.]

From the classroom observation, it is clear that the teacher used the traditional way of teaching where he was the source of knowledge, while the students were the recipients and users of such knowledge. "It is a very difficult lesson," said Jihad, "and the students have a cumulative weakness in mathematics." When I asked Jihad about how he taught the Internet unit in Grade 9, he said:

> *I use the net, they look at my screen when I open a search engine for example, and teach them about the e-mail, and how to open an account, how to search using searching tools, and looking through some important URLs, and so on. I'm planning to teach them webpage design if time permits.*

Jihad is an ambitious teacher, and he hoped that the students and the teachers would use the website he built for communicating. He already started asking the students to send him their homework through e-mail, and to start a forum and so on.

Results from focus group discussions with the students reveal that most of the students have computer and Internet at home, which is the primary location for their Internet use. Those who do not have Internet access at home use it either at their friends' or relatives' homes or at the Internet café in the village. The questionnaire results show that 72 percent of the students have computers at home and 65 percent have Internet access from there. The obstacles these students talked about were similar to those of the students at Turmos Aya girls school – lack of time for using the Internet, the slow speed of the internet, and the high subscription rate from home. The students use the Internet for various purposes, such as finding information to do their reports or homework, playing games, entertainment and news, and, most importantly, chatting with their relatives and friends abroad.

What is common among the students is that they all learned about the Internet from resources outside the school, either from their friends and relatives or by self-learning.

They talked about the computer teacher, Jihad and his effort to motivate them to use the Internet in different ways, and that he concentrates mostly on the communication between him and the students. Some of their comments were as follows:

> *The most website that I access is my school website. There is a place where we could write essays, and participate in discussion groups. I once sent the homework to our teacher and a thanks letter too.* (Yousef, Grade10)
>
> *The technology teacher promised that if we send e-mails to him he will give us grades.* (Jihad, Grade 9)
>
> *Our technology teacher started the school year with the Internet lesson. He taught us how to use the e-mail so that we could communicate with him.* (Najeh, Grade 9)

In this village, there is only one computer center outside of the school, which forces students to connect from home. One of the students said:

> *It costs us 5 NIS [~$1.20] per hour in the Internet café, and it is not like the other Internet café in Ramallah city, where we can access the Internet by ourselves. On the contrary in the village, the internet café manager connects the Internet only when we need a report or a subject for our homework, he will search for us and print what we need.* (Naser, Grade 10)

As for the kind of homework, students also talked about specific subjects that their teachers assign, such as searching about a poet or Islamic figure, and subjects about the parts of the body. But they also said the teachers do not direct them to use the Internet, and even prefer that the students use the library instead. One of the students commented,

> *Some of our teachers need us to work hard, they don't believe in the information we get from the Internet, that's why they prefer to submit a handwritten report, for example, referenced from a library.* (Sa'ed, Grade 10)

With respect to the teachers, and according the results of the focus group, most of them know that the Internet is useful, but they expressed their reservations. They themselves do not use the Internet very often even though they know they can benefit greatly. Some of the comments on that issue were:

> *The Internet entered our school and yet we are not ready for it. It is like a weapon with two edges, and we must know how to deal with the*

consequences of bringing such technology in our school. (Mostafa, PE teacher with 20 years' experience)

I don't use Internet in teaching, and I guess that it need more effort to control the students because the Internet is an open space. (Tareq, Mathematics teacher with 10 years' experience)

The teachers themselves do not use the Internet from school because of the time restriction and the condensed curriculum that they have to finish with limited time. They know that the students are good on the Internet and they try to ask for reports about different subjects.

The Case of Al-Amari Boys and Girls Schools (Camp Schools)

Both Al-Amari Boys (1100 male refugee students and 30 teachers) and Girls schools (900 female refugee students and 30 teachers) are under the supervision of the United Nation Relief and Work Agency (UNRWA), and are located at Al-Amari refugee camp near Ramallah city. UNRWA schools, like the governmental schools, use the New National Curriculum. These two schools, like the other UNRWA schools, are not connected to the Internet, and, according to the senior officer of UNRWA in Jericho and Ramallah, these schools are not permitted to connect the computer labs with the Internet due to budget constraints.

Even though the local community in the camp is considered poor and the families are from a low socio-economic background, what make these schools unique is the direct interference of the institutions and foundations inside the camp in developing the ICT aspects. Institutions like the Child Club, Bissan, Intel Club, and the Youth Club conduct free training courses for the students in these schools.

In the girls school, there are only six computers in the lab. Suhad, the computer teacher, said that she is obliged to teach about the computer theoretically. Sometimes she divides the students in her classroom into groups and takes six students together to the lab for 10 to 15 minutes just to show them some computer applications that she explained theoretically in the classroom. She then takes another group to the lab, and so on until the 45-minute lesson ends. She added, "it is really a relief for me to know that even though the ICT in the school is bad, they know how to use the ICT very well, even better than me."

On the contrary, the Al-Amari Boys School has a modern computer lab with 24 new Pentium IV computers, most of which came as donations from the local institutions in the camp. The students go to the lab once a week to attend the technology classroom.

Because of the low economic situation of the teachers and the students in the camp in general, a small percentage of them have computers at home. Therefore, they rely on the clubs and Internet cafés to use the computers and access the Internet for doing their homework and assignments, and most often chatting and e-mailing their friends and relatives.

The students at both Al-Amari Boys and Girls schools were enrolled in many courses concerned with programming and animation. Nour, a Grade 9 student at Al-Amari Girls school said that she was fortunate to be among those who took the Photoshop and the Flash course organized by Intel Club. She adds, "I now know how to design pictures, and animate them using these programs... if I want I will work in one of the publishing companies...I love this job." Tasneem, a Grade 8 female student, was also excited to have a webpage design course organized by the Youth Club. She explained, "the youth club distributed a registration form in the school for the course for free, and I did not believe that I was nominated...now I have my own website and I can design a website for my friends too." Nafez, a Grade 9 student at Al-Amari Boys school, said that the welfare association nominated his name among other students to go to the USA and present his animation project there. He elucidated, "I used the Photoshop and Flash programs to design a website about the air pollution." Na'eem, a Grade 9 male student, said that he learned about the Internet facilities through a course organized by the Women's Center. He explained, "It was very useful. I learned about how to use the e-mail, chatting, search for subjects, download and how to make WebPages." Kifah, a Grade 8 student at the girls school, says that she uses e-mail and chatting for educational issues. She often uses e-mail for attaching assignments to her friend who was absent.

On the other hand, teachers in these schools were subjected to literacy courses organized by UNRWA headquarters. A small number of the teachers in these schools use the computer, mainly the office program either at home, clubs, or at their school to make their grades, write quizzes and exams, and to save data. They sometimes ask their students to research various subjects, such as pollution, famous figures, etc., but they do not direct them to the Internet. One of the teachers expressed her discontent with those students who bring subjects from the Internet, saying that they cut and paste without really understanding the subject.

The gap between the teachers' and the students' ICT knowledge is wide, and this is a problem for the Girls school Principal Hanin: "Now I'm asking the intuitions to do some training to my teachers...a representative of Bissan Institution came once to train the teachers, but the problem was that the teachers have no time and have a lot of responsibilities." She added, "It is easy to permit some of the students to go out of school for training, but it is difficult for me to permit the teachers ... the whole school schedule will be interrupted."

Focus groups with students in both schools revealed that the major problem for ICT use is the lack of time and the lack of financial resources to access the Internet. Another important issue in these schools – as in other schools – is the teachers' and parents' attitudes and beliefs about the Internet, which I will discuss further later in this paper.

The Case of Balatah Schools (UNRWA schools in Balatah Camp, Nablus)
Teachers

The situation in the Balata schools in Nablus is no different than those in schools at Al-Amari Camp. One hundred forty-seven students completed the questionnaire from the Balatah Boys and Girls Schools. Forty-two percent of the fathers at Balatah boys schools work in craft and related works; 21 percent are professionals, technicians, associate professionals and clerks; 14.8 percent work in basic occupations (porters, workers, gatekeepers, servants); and 10 percent do not work. At the Balatah Girls School, 13.9 percent of the fathers work in craft and related works; 18 percent of them work in basic occupations (porters, workers, gatekeepers, servants); and 39 percent do not work.

As at Al-Amari schools, and because of the severe economic situation of the families in the camps in general, the percentage of students who have computers at home in these schools is relatively small compared to the other targeted schools. Only 54 percent of the students at Balatah Boys School who filled the questionnaire have computers at home, while only 30 percent of the students at Balatah Girls School have computers at home.

Concerning the Internet, while 16 percent of the students at Balatah Boys School have an Internet connection at home, only 12 percent of them actually use it from there. These percentages are the same at the Balatah Girls School. Of the students who completed the questionnaire at both schools, 73 percent attributed the lack of use of ICT to financial obstacles (computer price, costs, internet subscription fees, telephone bills, etc.).

Unlike Al-Amari camp, the contribution of the NGOs and the local community towards ICT in the schools is insignificant. Students sometimes turn to the Internet cafés for entertainment and to do their homework and research. Even though there are many computer clubs and Internet centers distributed all over Balatah camp, only 5 percent of the students at Balatah Boys School use the Internet at Internet cafés; none of the students from Balatah Girls School go to the Internet cafés.

The role of the Balatah schools in developing the students' ICT skills is quite limited. The questionnaire revealed that, while nearly 47 percent of the students' knowledge about how to use the Internet in both the boys and girls schools were from the technology curriculum at the school, 35 percent of their knowledge was through self-learning, and 20 percent from their parents and relatives. Even though 40 percent of the boys said that they learned how to use the Internet from their friends, only 8 percent of the girls attributed their knowledge of the Internet to their friends and colleagues.

Table 1 summarizes students' ICT activities. Balatah Boys School students cite their main activities such as playing games, following the news, finding lessons related to their studies, and finding subjects for assigned research projects.

Activities vs. school	Playing games	School researches and projects	Finding lessons related to the curriculum	Doing homework	News	General knowledge in science and technology	Entertainment
Balata Boys School (61 students)	31.1%	29.5%	31.7%	13.3%	32.8%	18.0%	21.3%
Balatah Girls School (78 students)	11.7%	28%	23.4%	6.5%	9.1%	13.0%	10.3%

Table 1: The ICT activities of students at Balatah Boys and Girls Schools

The Balatah Boys School has 30 male teachers and 210 students who are refugees. The computer lab in this school contains 13 computers (7 Pentium IV and 6 Pentium II). According to the technology teacher, no Internet connection is available except in the principal's office. Students use the computer lab in the school only during the technology period, which is 45 minutes each week. Most of the students in the focus groups expressed that the Internet is very important to them. Ja'far, a Grade 9 student, said, "Before, we used to go to the library to get the information for our assignments, but now, after I learned about the Internet, it became an easy process."

Table 2 shows how the students in both Balatah Boys and Girls Schools use the Internet for communication. The percentages indicate that Internet is used for purposes other than communication.

Communication use / school name	e-mail use in general	Using e-mail to communicate with their colleagues	Using e-mail to communicate with their family and friends	Chatting with family and friends
Balata Boys School (61 students)	14.8%	9.7%	17.7%	19.4%
Balatah Girls School (78 students)	9.0%	7.7%	10.3%	9.0%

Table 2: Percentage of students who use the Internet for communication

According to Mohannad, a Grade 9 student, frequent loss of power at the school is an obstacle in using the computer. Another obstacle the students mentioned in the focus group has to do with their parents' beliefs about the Internet. One of the Grade 9 students elaborated on this issue: "My father won't let me use the Internet because he thinks it contains dirty things. They don't know that it is useful and we do our homework from it." Nearly 30 percent of the boys who answered the questionnaire said that their parents believe that the Internet may ruin their children's ethics (or morals). Eighteen percent said that their family forbids them from using the Internet at home.

As for the teachers, the focus group revealed that the Internet is a very useful tool for gathering information. The social sciences teacher commented, "Without the Internet, I would not have finished my Master's so fast." Another teacher said that the Internet is very important for him so he can stay updated with the new information concerning his specialization. Some of the teachers use the Internet for news, chatting, and using e-mail to communicate with families and friends. Teachers during the focus group expressed their need for training courses on computers and the Internet. One of the teachers said, "There was a training course in which two teachers who had good knowledge in computer skills planned to give us training, but the employees' strike started and we didn't continue."

When asked about the obstacles they face in using the Internet in teaching and whether they would use it if it were available, all teachers were hesitant. They all said that teaching with the Internet requires a lot of planning and training, and they are not yet ready for it. They also expressed their discontent about the open nature of the Internet and the "bad" websites that their students might be exposed to. All the teachers believed that there should be well planned censorship procedures in place, which would require significant effort.

Things are quite different at Balatah Girls School. The school has 34 female teachers and 215 female refugee students. There is no computer lab in the school. There are only four Pentium II computers: one at the principal's office and the others at the vocational classroom. None are connected to the Internet. According to the technology teachers, most of the technology lessons related to computer skills are taught theoretically due to the small number of computers available.

Girls face more obstacles than the boys in regard to their family beliefs about the Internet. Forty-two percent of the girls who filled in the questionnaire said that their families do not allow them to use the Internet from home; 40 percent said that they face difficulties in convincing their family of the importance of the internet. Furthermore, 45 percent of the girls said that their families forbid them from going to the internet cafés and club centers.

The teachers at Balatah Girls School feel that the absence of ICT facilities makes teaching more difficult. Sana', an English teacher, explained: "We have a number of educational CDs, but because of the lack of computers, we often do not use them, and prefer to use other tools such as drawing on the board, or using transparencies." Ula', a science teacher, said that the Internet is very important for her, and she wishes that there were a computer and an Internet connection in the staff room so that she could download animated lesson plans. She elucidated: "I sometimes use the Internet from Al-najah University to search for lesson plans, but most of the WebPages I enter need subscriptions, which I cannot afford, [and] neither can our school budget."

The teachers in the focus groups talked about the difficult financial situation of their school. Riham, the technology teacher, said that her school could not always afford the ink cartridge for the school printer. She added, "This makes me think a thousand times before I use the computer for my lesson plans." Riham's home computer is connected to the Internet, and she always tries to help other teachers to find resources on the Internet, and prints their lesson plans.

Although the teachers know that the school has little to offer in the field of ICT, they realize that the students have adequate computer and Internet skills. They talked about how some students prefer to use the Internet at their homes for their assignments. The English teacher talked about the Internet cable phenomenon, saying that such a facility in the Balatah camp provides an opportunity for the students to use the Internet, even though she believes that many students use this access for non-educational purposes. The science teacher, however, believes that the cable facility is educational and useful to the students. She shared her astonishment when one of her students brought new information from the Internet related to polymers and plastics. She added: "I let the girl present what she found in front of the class, so that we all could benefit." The teachers do not direct their students to use the Internet to do their homework because they know that the Internet in the camp is expensive, and not all the students can afford it. Ula', the science teacher, said, "Sometimes I feel happy that students bring their subjects from the Internet, but I do not show my feelings to them because most of them do not have Internet at home or do not have money to go to the Internet centers which cost sometimes 10 NIS [approximately $2.30] for one hour access and printing."

The Case of the Friends Boys School

Friends Boys School, located at Al-Bireh city, is a private school with 550 male and female students, and more than 40 female and male teachers. Unlike the UNRWA and the governmental schools, this school depends on students fees and tuitions to run its services, and is considered one of the most expensive schools in Palestine. Students must come from high socio-economic backgrounds in order to afford tuition.

The school has two computer labs (30 Pentium IV computers in each lab) with an LCD projector. The teachers' room contains a computer lab with 10 computers, and there are 10 computers in the library. All the computers are connected to the Internet with 192 lease line connections.

One of the unique features of this school is the integration of ICT in all the educational subjects, and this is due to the nature of the curriculum. Although the primary and the lower elementary levels follow the National Curriculum in part, the upper elementary level (Grade 10) and the secondary levels (Grades 11 and 12) follow the International Baccalaureate (IB) curriculum in which the teachers prepare the subjects according to a syllabus with general objectives, thus the teachers have to select the appropriate teaching resources. This kind of curriculum, according to the teachers, enhances the use of ICT in teaching in all classes, not only in the technology classes. According to Wael, a mathematics teacher, the IB program requires teachers to refer to educational e-learning websites, to use e-mail to communicate with other teachers and with their students, and to use a virtual database to send reports and scores to the administration.

Jihan, the biology teacher, invited me to the computer lab where she wanted to discuss a biology lesson with her Grade 10 students. The subject was the human circulatory system. The students (male and female) were sitting in a half circle in front of the LCD screen where the teacher stands. Jihan went to the GETBODYSAMART.com website to explain the blood circulation, and she used the Internet throughout the period. The teacher's role was to facilitate the lesson and to organize the dialogue between the students. After the presentation, the students went to the computers and used the Internet to complete the assignment.

Discussion

The process of ICT integration in Palestinian society impacts both the teachers and the students; it also seems that this impact is more outside the schools than inside.

The quantitative results of this study shows that of the 582 students who answered the questionnaire, 57 percent have computers at home, while 33 percent have Internet access from there (see Table 3).

The quantitative data also show that of the 132 teachers who filled in the questionnaire, 65 percent have computers at home, and 63 percent have Internet access at home.

Results of the questionnaire also reveal that teachers and students use the Internet in education only for gathering information, such as information related to their school research and reports, lessons related to the curriculum, and homework (see Table 4). Moreover, these activities are mostly conducted outside the school (i.e., at home, Internet cafés, and clubs), since the computer labs in the targeted schools are only used for the technology classes (i.e., 45 minutes/week) to teach general computer skills, as indicated previously.

Activities such as playing games, following the news, entertainment, and communication are most commonly used by the students. The education system considers these non-educational uses. Table 4 indicates that nearly 25 percent of the students in the targeted schools use the Internet for playing games and for entertainment goals. This is a relatively high percentage compared to the 30 percent scored by school research and curriculum-related activities.

	Computer and Internet acquisition and use at home				Computer and Internet use at school			
	Teachers(%)		Students(%)		Teachers(%)		Students(%)	
	Computer	Internet	Computer	Internet	Computer	Internet[1]	Computer[2]	Internet
Male	70.9%	55.0%	59.1%	36.6%	27.3%	11.0%	68.7%	10.4%
Female	57.0%	46.0%	55.8%	30.3%	21.9%	19.0%	55.6%	4.4%
Residence								
• City	72.9%	50.0%	69.4%	46.7%	25.0%	27.6%	49.7%	3.6%
• Village	61.1%	55.6%	67.1%	48.9%	25.9%	19.4%	76.0%	13.4%
• Camp	56.7%	53.3%	44.4%	16.5%	30.0%	26.3%	61.8%	6.1%
Total	64.4%	63.3%	57.3%	33.2%	26.5%	24.1%*	61.7%	7.2%*

Table 3: Computer and internet acquisition and use at home and schools

* The percentage represents those schools that have Internet access (Friends Boys School, Al-Hashimiyeh School, Turmos Aya Boys School and Ramallah Girls School).

1- Taking into consideration that even though some schools have no Internet access in their computer lab for students; most of the schools have an Internet connection at the administration office.

2- Most of the students use the computers at the computer lab in the technology classes only.

%Activities vs. gender, place of residence,	Playing games		School researches and reports		Finding lessons related to the curriculum		For exams/homework		News		Entertainment	
	T*	S	T*	S	T	S	T	S	T	S	T*	S
Males		36.0		49.6	30.4	29.0	8.9	16.3	34.8	26.3		31.8
Females		16.3		33.7	20.0	30.6	10	12.4	26.5	12.7		19.5
- City		22.3		51.8	20.0	38.0	14.3	13.8	23.5	16.2		32.0
-Village		34.3		46.4	23.2	28.5	7.0	16.6	27.9	19.6		28.2
- Camps		22.8		31.0	36%	25.6	4.8	13.1	45.4	20.4		18.8
Total		25.5		31.0	25%	30.0	9.1	14.2	30.3	18.9		25.0

Table 4: Teachers' and students' main Internet activities (T=Teachers, S=Students)

* No such item in the teachers' questionnaire.

Concerning the communication activities, which are also restricted at the schools that have Internet, Table 5 indicates that 22.2 percent of the students use e-mail in general, and 24 percent of them use it for communicating with their families and friends. The communication activity is conducted from homes or public places like Internet cafés and centers.

More comprehensive and recent data from a survey undertaken by the Palestinian Central Bureau of Statistics (PCBS, 2004) conducted on a random sample of 7557 families in the West Bank and Gaza Strip, sends a similar message concerning the impact of ICT and its use inside and outside the educational system. The study indicated that 26.4 percent of families have computers at home. The study also indicated that home is the most likely place for family members to use the computer (47.0 %). The highest percentage for reason for use was for entertainment purposes (40.5 %), followed by educational purposes (32.1%).

Communication activities / gender, place of residence	e-mail use in general		Using e-mail to communicate with colleagues		Using e-mail to communicate with family and friends		Chatting with family and friends	
	T	S	T	S	T	S	T	S
Males	30.5	30.1	11.3	20.4	33.4	28.2	28.8	26.2
Females	23.5	15.6	4.0	12.3	24.4	20.4	12.8	13.6
- City	29.7	33.3	7.2	21.7	26.5	33.0	21.3	28.1
-Village	34.2	21.4	9.6	17.3	29.3	25.0	14.6	22.4
- Camps	17.4	15.4	8.6	11.3	34.8	17.3	27,2	12.3
Total	28.7	22.2	7.2	16.0	29.6	24.0	19.8	19.4

Table 5: Students' communication activities using the Internet

The same study (PCBS, 2004) revealed that 9.2 percent of the targeted sample of families in the West Bank and Gaza Strip have access to the Internet from different locations; 40.7 percent of them were male, while only 23.7 percent were female. Furthermore, the highest access is from home (38.4 %) and is used mostly for personal knowledge acquisition (27.5%), followed by education (19.8%), personal communication through e-mail (17.0 %), chatting (13.1%), entertainment (11.2 %), and finally for work and electronic commerce (10.9% and 0.3% respectively).

Starting from the previous quantitative data, supported by the results of the qualitative data, I claim that even though the impact of ICT on young people's lives outside the school is significant, there is a lack of impact of ICTs on the educational system. Even though ICT in Palestine is spreading at varying rates across different segments of the population, ICT in the educational sector is still far from revolutionary. I maintain that the millions of dollars spent on computers and technology in schools seems to reinforce the social digital divide or "digital inequalities".

The findings of this study indicate that computers in the targeted schools are rarely used by the teachers in general; if they are used in teaching, they concentrate on low-level skills such as how to use office software. The most common use of computers in the schools is during the technology lessons (i.e., 45 minutes per week). Among the 132 teachers who answered the teacher questionnaire, only 26 percent of them use the computer at their schools (see Table 3), and most of them are those teachers who teach the technology curriculum. What raised the questions on the impact of ICT in Palestinian schools is that students are far ahead in their ICT knowledge than the teachers and the curriculum expectations. With respect to the Internet, among the 582 students who answered the student questionnaire, 78 percent of them use the Internet from places other than school, and they learned how to use the Internet from sources other than the curriculum. Forty percent of the students learned to use the Internet by themselves, and 20 percent from their friends. Even though there is a whole unit about the Internet in the Grade 9 technology curriculum for the first time, the focus group revealed that the students knew how to use the Internet before they reached Grade 9.

This gap between what the formal education offers, on the one hand, and the younger learners' knowledge about ICT on the other hand, has been raised elsewhere as a serious challenge facing ICT integration endeavors, and leads to increasing digital inequalities, or the so-called "digital divide" (Hird, 2000; Richards, 2004; Somekh, 2004; Hargittai, 2003).

Hargittai, for example, refined the term "digital divide", asserting that this term is controversial and should be viewed in terms of how people use the Internet rather than in terms of simply who is or how many are online (Hargittai, 2003). Hargittai referred to Warschauer (2002) in his classification of the kinds of access that lead to digital inequalities such as "cognitive access" (i.e., whether people are trained to use ICT) and "production of content access" (i.e., the availability of enough materials, language, literacy, education, and institutional structures). Hargittai (2003), in her turn, defined five other factors that need to be considered when talking about the digital divide and inequalities. They are:

1- Technical means (i.e., the quality of equipment, such as better hardware, software, faster connection and better line infrastructure).
2- Autonomy of use (i.e., freedom to use the ICT, location of access, time available).
3- Social support networks (i.e., social encouragement and assistance from families, friends, relatives, teachers, etc.).
4- Experience (i.e., number of years using the technology, types of use patterns).
5- Skill (i.e., ability to use the ICT efficiently and effectively).

All these factors must be considered when studying the "digital divide" in Palestinian society. The gap between what the formal education offers and the younger learners' knowledge about ICT and its role in increasing the digital divide could be understood if we look at how the schools are using ICT in education, how the curriculum is dealing with the ICT issue, and how families understand the role of ICT in education. I will focus on these issues in the following sections.

The Role of the Schools in the "Digital Divide"

As mentioned in the cases, the MoEHE and UNRWA headquarters do not allow school budgets to pay for Internet connections. As a result, the governmental schools, which represent 70 percent of schools in Palestine, must seek donations from the local community and institutions to provide Internet access. This measure operates differently depending on school location (i.e., village, city, or camp), and whether the school is a boys or girls school.

The schools in the city benefit from the modern underground infrastructure that allows high-speed connections. Schools in the villages, however, use dial-up lines, which were developed only recently. Furthermore, urban schools can seek funding from the intensive density of NGOs and other institutions, compared to village schools, which depend only on the PTAs and the local community for fund raising. The economic situation of a particular village and the students' socio-economic backgrounds, the degree of cohesiveness among parents, and the community in the village all influence connecting schools and homes to the Internet, as we saw in the Turmos Aya schools cases. The results of the questionnaire reveal that, among the 140 students who answered the questionnaire in the Turmos Aya schools ("village schools"), 70 percent have computers at home, nearly 40 percent of which have access to the Internet. The percentage is close to that of the targeted city schools' students (70 percent of the 171 students). This percentage is considered high compared to other village schools due to the general economic status of Turmos Aya village residents (see Table 6).

School Name	% Using computer at		%Using internet at	
	Home	Cafés	Home	Cafés
Balatah Boys (UNRWA, Camp)	54.7	11.3	12.7	7.9
Balatah Girls (UNRWA, Camp)	39.5	1.3	12.4	0
Turmos Aya Boys (Governmental, Village)	72.9	33.3	52.0	12.0
Turmos Aya Girls (Governmental, Village)	70.5	1.6	28.6	1.4
Al-Amari Boys (UNRWA, Camp)	48.5	54.4	13.9	20.8
Al-Amari Girls (UNRWA, Camp)	58.1	8.1	13.2	0
Ramallah Girls (Governmental, City)	61.8	19.1	17.8	13.7
Al-Hashemiyeh (Governmental, City)	63.1	80.0	34.9	54.7
Friends Boys (Private)	100.0	32.0	84.0	16.0
Males	59.1	47.8	36.6	22.1
Females	55.8	7.5	30.3	5.8

Table 6: Percentage of students who use the computer and the Internet at home by school name

Things are different in the UNRWA schools located in the refugee camps, where Internet access is totally forbidden. The Al-Amari schools case is a unique case where institutions and NGOs have a direct role in conducting ICT training courses for the students. These advantages are not found in the Balatah schools. Students have little opportunity to use the Internet there. As for computer acquisition at home, among the 271 students in the targeted schools in the camp, only 44 percent have computer at home (compared to higher numbers in the villages and the cities), 16 percent of which have access to the Internet (see Table 3 and Table 6). These numbers reflect the economic situation in the refugee camps, forcing students to rely on the local community and NGOs that are located in the camp, if there are any.

From a gender perspective, even though ICT, according to many studies, helps equalize educational opportunities between male and female students, this is far from true in Palestinian schools due to cultural values and beliefs.

The data indicated that female students have few opportunities to access the Internet outside of their schools and homes. This may be due to traditional beliefs about the role of the females in the Arab culture, especially in the villages and the camps. For instance, among the 247 male students who answered the questionnaire, about 50 percent use the computer at Internet cafés and clubs, while only 7 percent of the 279 female students surveyed use the computer at the clubs and Internet cafés. Furthermore, the questionnaire revealed that male students tend to use the Internet differently than female students. For example, 30 percent of the male students reported using the e-mail, while only 16 percent of the female students did so. Also, 45 percent of male students use the Internet for chatting compared to 24 percent of female students, and 55 percent of male students play games on the Internet compared to 29 percent of female students. Even though 45 percent of the students at Turmos Aya Girls School have Internet access at home, only 28 percent actually use it, compared to higher levels for male students.

These differences in Internet use could be related to the previous comment about the female students' opportunities to access the Internet.

The Role of the Teacher and the Curriculum in the "Digital Divide"

The bureaucratic structure of the school has been intensified by the new National Curriculum. Recent studies show that it represents official texts that transmit aspects of authority, which many have described as a replica of the educational systems in most Arab countries (Moughrabi, 2002; Wahbeh, 2003). The National Curriculum is based on the assumption that teaching subjects, including technology, should start from scratch regardless of the skills the students may already have acquired. The fact that students have learned about ICT outside of the school setting is an example of a deficiency in the new technology curriculum.

The nature of the technology curriculum, and the fact that ICT is not treated as an interdisciplinary issue, affects the teaching pedagogies. Results of the focus group and the teacher questionnaire indicated that 90 percent of the teachers considered lack of time as the main obstacle standing in the way of using ICT. This has also affected student practices, in which they separate the use of ICT from their learning process.

The difference between students' experience of ICT at school and outside the school has been the subject of recent studies. Sharples (2003) argues that ICT's integration in the traditional educational systems, in which strong classification and framing of knowledge exist (Bernstein, 1971), have the potential to disrupt the routine procedures of schooling. This could lead to a resistance of change toward an interdisciplinary ICT approach (i.e., integrating ICT in different subjects, using ICT in school projects and for communication between students and teachers, collaborative learning based on students' previous ICT knowledge, etc.)

Furthermore, the fact that those teachers in the targeted schools are reluctant to direct students to use ICT for homework and assignments is now considered a source of a "second digital divide" (Somekh, 2004). Somekh relates to Lewin (Lewin et al., 2003) in explaining such a concept: when teachers do not direct students to use ICT to do their assignments, those from homes with high cultural capital are much more likely to choose to use ICT for schoolwork than those with similar access to ICT at home. There should be more studies on this issue in the Palestinian context.

An interdisciplinary ICT curriculum should be called for so that the integration of ICT in the educational system succeeds. The IB curriculum at the Friends Boys School is an example of such a model.

The Role of the Family in the "Digital Divide"

The various focus groups with teachers and students and the result of the questionnaires showed the influence of the family beliefs and attitudes toward that ICT use. For example, focus groups with parents revealed that most of them worry about their children using the Internet, and believe that children must reach a specific age before they may be permitted to use the Internet. From the students' perspective, the questionnaire indicates that 19 percent of them face obstacles in convincing their parents of the usefulness of the Internet, and 50 percent of male students do not have parental support to use the Internet; this number rises to 57 percent for female students. In addition, 21 percent of male students face objections from their families if they want to go to Internet cafés and clubs, and 37 percent of female students face this problem (see Table 7). Furthermore, 40 percent of surveyed students indicated that their parents believe that the Internet will have bad ethical influences on them.

Parents in Palestinian culture overestimate the dangers of ICT. As a result, teachers and families take several censorship measures such as hampering, using filters and screening software, preventing the child from using the Internet alone, etc. These measures are often more strict and severe for female students than for male students.

School Name	Family objection to use the Internet from home	Obstacles in convincing the family about the Internet usefulness	Family does not encourage their child to use the Internet	Family objects to their child going to the Internet centers and cafés	Family objects to their child using the Internet at school
Balatah Boys (UNRWA, Camp)	17.7	11.5	58.6	30.6	11.5
Balatah Girls (UNRWA, Camp)	41.6	39.2	75.7	45.3	10.8
Turmos Aya Boys (Governmental, Village)	6.1	10.2	34.0	12.2	2.0
Turmos Aya Girls (Governmental, Village)	8.8	7.6	52.2	44.9	9.0
Al-Amari Boys (UNRWA, Camp)	14.1	18.3	47.8	20.8	4.2
Al-Amari Girls (UNRWA, Camp)	12.3	19.4	64.1	34.7	13.9
Ramallah Girls (Governmental, City)	14.7	25.4	42.9	27.1	10.1
Al-Hashemiyeh (Governmental, City)	14.1	15.9	21.7	17.7	7.7
Friends Boys (Private)	4.0	12.0	12.0	16.7	4.0
Total	16.4	18.8	49.2	29.6	8.7
Males	13.2	14.0	50.4	20.5	6.5
Females	17.0	23.0	57.3	37.3	10.6

Table 7: Percentage of students expressing obstacles due to family beliefs

Conclusion

This study explores the challenge of integrating ICT in the Palestinian educational context. ICT integration has a significant impact on the lives of students, teachers, and the general Palestinian population in terms of information gathering and communication. This has become vital, especially during the second Intifada. This impact cannot be seen in isolation; it gains greater salience in relation to the wider social and cultural context. My focus was on the problems and challenges of using ICT in the context of the existing social organization of schools, the traditional classroom structures with the existence of a traditional curriculum, and the local community values and beliefs concerning ICT. Data gathered elicited information on different uses of ICT by teachers and students, and the contribution of teachers' pedagogy in ICT classrooms on social and economical inequalities and the "digital divide".

The "digital divide" problem is made even more difficult by the low quality of training teachers receive in Palestine concerning ICT and other subjects (Wahbeh, 2003); the rapid development of ICT hardware and software; the small number of teachers trained with new ICT pedagogies; and the increased pressure to have teaching and school curricula under tight control for the purposes of efficiency, cost effectiveness, and accountability.

The study suggests that witnessing positive results of ICT integration will require more than simply making the ICT available to students.

Mark Warschauer (2002) claims that the digital divide is no longer a technological question, and that the emphasis should be moved "towards social questions and inequalities in use modes." Starting from Warschauer's "literacy" model, ICT can empower the Palestinian education system if students' and teachers' roles are reconceptualized to make them active agents participating in meaningful learning. Literacy in this model includes more than just general and technical skills. It also includes levels of skills "sufficient to process and make use of the information and involve not only receiving information but also producing it."

ICT is used very rarely in the Palestinian schools, and the gap between the knowledge that schools provides and the knowledge acquired by the students outside the school is increasing. The role of the Palestinian schools should be changed to more fully reflect the literacy model proposed by Warschauer. Recent studies suggest pedagogical recommendations (i.e., teachers should motivate the students toward "active, self-directed, inductive, and exploratory ICT activities" [Lepper and Ghabay, 1985]). Other studies suggest that in order for ICT to enhance student involvement in their learning process, schools must adopt teachers' empowerment measures, such as providing high quality training courses based on projects, and making time in teachers' schedules for developing and coordinating ICT activities (Schofield and Davidson, 2002). These recommendations could prove effective in the short term. However, they could conceivably have the opposite effect of widening the "digital divide" in the long run if other factors such as the cultural beliefs and values surrounding ICT are not considered.

Even though the results of this study are not conclusive, they can be taken as a pointer. More systematic micro-studies of ICT integration in Palestine should be conducted.

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The Telecommunication Sector in Palestine: Legal v. Factual

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1. Introduction

Information technology and telecommunications play a significant role in the development of society and its increase in levels of education, knowledge and economy. They also improve the global standard of living and contribute to inter-society integration. Information technology has provided an opportunity for Palestinians, a people that has suffered for many years from the continuous inability to join the telecommunications and information technology revolution which is considered the backbone for establishing and consolidating social and economic development. Israel considered the growth of this sector a security threat and resorted to Israeli military orders and regulations to limit it throughout the ongoing occupation of Palestine[1]. As a result, the telecommunications systems in the West Bank and the Gaza Strip (WBGS) were completely integrated with the Israeli network, and have been kept under the control of the Israeli civil and military authorities.

Telecommunication networks in Palestinian cities were connected to neighboring Israeli cities and settlements. For example, Ramallah, Al-Beireh and Jericho were connected to the Israeli exchange in Jerusalem, and the Hebron network was connected to the Israeli settlement of Kiryat Arba. Furthermore, it was difficult – sometimes impossible – to acquire a telephone line from the Israeli military administration; therefore, only a small number of Palestinian households have telephones. In Hebron, for example, 2,000 telephones serve 70,000 residents. The teledensity (fixed telephone lines per 100 inhabitants) never exceeded an average of 3.14 percent in the West Bank and Gaza. The lack of Israeli services in Palestine, and their disinterest in developing the telecommunication network, left this sector in its primitive form[2].

The Palestinian telecommunications sector experienced significant turning points after the signing of the Declaration of Principles in 1993 and the emergence of the Palestinian National Authority (PA). Oslo Accords has transferred to the PA the exclusive control of the telecommunication sector in some parts of the WBGS. Immediately after its establishment, the PA prepared an emergency plan to expand and improve the devastated situation it had inherited from the Israelis. The PA established the Ministry of Telecommunication to be responsible for building and developing a new telecommunications system, including proper legal framework, infrastructure development and rehabilitation of telecommunication networks[3]. It also enacted the Telecommunication Law, which provided the legal framework for telecommunications in Palestine. The PA decided to build and privatize the telecommunications sector, which culminated in the License Agreement with the Palestinian Telecommunications Company (Paltel), in which Paltel had the exclusive right to exploit Palestinian telecommunications.

Obstacles to the development of the Palestinian telecommunications sector have not been overcome as a result of the Palestinian-Israeli agreements and the Palestinian measures. Israel is preventing the import and release of goods and equipment destined to develop the information technology and telecommunications networks, and allowed and encouraged the illegal infiltration of its Mobile Companies into the Palestinian telecom market. Furthermore, the Ministry of Telecommunication and Information Technology's (MTIT) regulation of the telecommunication sector was not consistent with best practices and norms.

Accordingly, the aims of this paper are to explain the legal and current reality of the

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[1] Such as the Israeli Military Order No. 79 of 1967 on Transmission and Signaling (West Bank), Proclamations, Orders and Appointments (Israeli occupation-West Bank) No. 627/11/1967, p. 198. And the Israeli Military Order No. 92 of 1967 on Transmission and Signaling (Gaza Strip), Proclamations, Orders and Appointments (Israeli occupation-Gaza Strip) No. 4, 24/01/1968, p. 277.

[2] United Nation Conference on Trade and Development (UNCTAD), Developments in the Services Sector in the West Bank and Gaza Strip 1967-1990, March 7, 1995.

[3] Ministry of National Economy, Palestinian National Strategy for Economic Development: Creating an Economically viable Palestinian State, August 2003.

telecommunication sector after the inauguration of the PA, to discuss its attempt to develop this sector by enacting the Telecommunication Law and signing an exclusive license agreement with the private sector, and to review the main external and internal obstacles hindering the development of the telecommunication sector in Palestine. In order to give a clear and comprehensive view of these aims, after introducing the topic, this paper will discuss (i) the legal framework of telecommunication in Palestine; (ii) the telecommunication players in Palestine; (iii) the consequences of the telecommunication reality; and finally (iv) will conclude.

2. The Legal Framework of Telecommunication in Palestine

This section will discuss the legal framework of telecommunication in Palestine as stipulated in the Israeli-Palestinian (peace) agreements since these agreements have given Palestinians, for the first time, control over their telecommunications and drawn their limits, borders and legal jurisdiction. International telecommunication practices (international law) must be explained in order to read the Palestinian telecommunication regulation in light of international best practices and their applicability to the Palestinian telecommunication sector. Following this, the PA legal framework covering the telecommunication sector and its compatibility with the Oslo Agreement and international law will be explained. Finally, this Title will overview the License Agreement, its implementation, and its effect on the Palestinian telecommunication sector.

2.1. Oslo Agreement

The Palestine Liberation Organization (PLO) and Israel embarked upon peace negotiations in 1993. This led to a number of agreements starting with a declaration of principles, which set the framework and agenda for a series of negotiations culminating in the Israeli-Palestinian Interim Agreement on the West Bank and Gaza Strip (Oslo Agreement)[4]. Annex III of this Agreement, entitled Civil Affairs, deals with the telecommunications sector in the Palestinian territories. Article 36, entitled Telecommunication, covers the PA jurisdiction over the telecommunications sector. This article is divided to four sections: (A) general principles; (B) specific principles; (C) electromagnetic sphere; and (D) telecommunication. Two schedules are also included: Schedule 5, a list of approved frequencies; and Schedule 6, a list of approved TV channels and the locations of transmitters.

Section (A) of Article 36 contains general principles drawing the PA jurisdiction over the telecommunications sector. In principle, Section (A) has given the PA control over planning, formulation and implementation of telecommunications policies, regulations and legal frameworks in the Palestinian territories. However, this control, on the one hand, must take into consideration the Israeli jurisdiction over Area C in the West Bank[5], and on the other hand, the Palestinian side must secure the approval of the Israeli authorities for any digging or building regarding telecommunications and any installation of telecommunication equipment. Finally, it states that the supply of telecommunications services to the Settlements and military locations, and the activities regarding the supply of such services, will be kept under the powers and responsibilities of the Israeli side.

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[4] It was signed in Washington D.C. on September 28, 1995. The full text can be found at the official website of the PA: http://www.pna.ps

[5] Article XI of the Interim Agreement between Israel and the PA divided WBGS into three areas. First, Area A, which includes the Palestinian densely populated areas (cities). This Area is under full Palestinian control. Second, Area B, which includes Palestinian territories with less populated areas (small towns and villages). This area is subject to a shared responsibility; the PA controls the civil matters and Israel controls security. Third, Area C, which includes unpopulated areas, settlements and military camps. This Area is under full Israeli control. For more, see RAJA S., *From Occupation to Interim Accord: Israel and the Palestinian Territories* (The Hague: Kluwer Law International, 1997).

In principle, this section contains two important elements. The first is that it has, for the first time since 1967, moved the responsibility for the telecommunication sector from Israel to the newly created PA, which means that Palestinians, not Israelis, will create telecommunications policy in WBGS. The second is that this responsibility is not exclusive but rather confined to the territories transferred to the PA's control, which are Areas A and B. In other words, the control over the telecommunication policy and the building of the Palestinian telecommunication infrastructure in Area C has been kept under the Israeli control. The scope of this restriction is better understood by noting that Area C represents 58 percent of the WBGS.

Section (B) includes specific principles related to the operation of the telecommunications sector. This Section gives the PA the right to build and operate separate and independent communication systems and infrastructures, including satellite networks for various services, as long as it ensures the use of the specified frequencies and channels covered by Schedules 5 and 6. The Palestinian side also has the right to establish its own telecommunications policies, systems and infrastructures, and to choose all kinds of communication systems (including broadcasting systems) and technologies suitable for future use in, *inter alia*, basic and value added services (including cellular telephony). Furthermore, this Section, as a pre-condition, forces any Israeli telecommunication company that intends to work in the WBGS to first obtain the necessary approvals from the MTIT, and vice versa. Finally, this Section does not allow the PA to establish an international communication network.

On the one hand, this Section explains the Palestinian jurisdiction over the telecommunication sector in the assigned territories, which is full and exclusive. On the other hand, it introduces more restrictions by prohibiting the Palestinian side from building an international communication network to connect it with the outside world, which means that it has to fully rely on the Israeli telecommunication network for such services.

Section (C) stipulates which radio frequency spectrum the Palestinians can use in their telecommunication services. The Palestinian side cannot use any other channels without the prior approval of the Israeli side.

It is important to note, in this regard, that it has been proven that these frequencies are not enough to accommodate the Palestinian telecommunication, media and information technology needs[6]. This is one of the main reasons for the inability of the MTIT to offer a bid for another cellular company. In accordance with the current available frequencies, any new cellular telephone company will be at a disadvantage. Jawwal has been using all the assigned 900 MHz frequencies, which is the most economically affordable frequency for mobile phone telecommunications. Moreover, Jawwal has been complaining that their assigned frequencies are not even enough to cover their own needs. In other words, if the PA wants to license a new GSM company, it must provide it with the same conditions and rules it has already provided to Jawwal. The only frequencies available now to the PA under the Oslo Agreement are 1800 MHz, which are four times more expensive than the 900 MHz. Finally, it is important to note that the PA has announced a new bid for what is called a trunking system, which is a system assigned at 410 to 450 MHz, for exclusive use of mobile services of civil and commercial trunking networks in the WBGS[7].

Section (D) is the most peculiar Section, since it gave the Israeli authorities and its telecommunication companies a veto over the Palestinian right to operate an independent telephone network. On the one hand, it stipulates that pending the establishment of an independent Palestinian telephone network, the Palestinian side shall enter into a commercial agreement with Bezeq, the Israel Telecommunications Corp. Ltd., regarding supply of certain

[6] An interview with Mr. Mahmoud Diwan, Director General of the MTIT in January 2005.
[7] An interview with Mr. Waseem Abdulah, Telecommunication Advisor at the MTIT.

services in the WBGS such as international telephony, payments by the Palestinian side to Bezeq and compensation by Bezeq to the Palestinian side, and the use of a separate area code and numbering plan. Such an agreement must apply between the two sides until they agree upon the installation and operation of an "international gateway", as well as the international code for the Palestinian side and the actual commencement of operation of said gateway. Furthermore, the Palestinian side shall enable the supply of telecommunications services to the Settlements and the military installations by Bezeq, as well as the maintenance by Bezeq of the telecommunications infrastructure serving them and the infrastructure crossing the areas under the territorial jurisdiction of the Palestinian side.

With regard to equipments and standards, as long as the Palestinian network is integrated with the Israeli network, the Palestinian side shall use such telephonic equipment as is compatible with the standards adopted and applied in Israel by the Israeli Ministry of Communications. The Palestinian side shall be permitted to import and use any and all kinds of telephones, fax machines, answering machines, modems and data terminals, without having to comply with the above-mentioned standards.

Finally, the Israeli side shall enable the supply of telecommunications services to the geographically-dispersed areas within the WBGS. This shall include provision, subject to the approval of the proper Israeli authorities, free of charge, of rights of way or sites in the WB for microwave repeater stations and cables to interlink the WB and to connect the WB with the GS. On the other hand, the PA shall take the necessary measures to ensure the protection of the telecommunication infrastructures serving Israel, the Settlements and the military installations, which are located in the areas under its territorial jurisdiction, while the Israeli authority shall take the necessary measures to ensure the protection of the telecommunication infrastructures serving the WBGS and which are located in areas under its responsibility.

2.2. International Best Practices

The World Trade Organization (WTO), under the General Agreement on Trade in Services (GATS), has intended to set up the best international telecommunication practices and regulate trade in telecommunication services. Annex on Telecommunication[8] elaborates upon the provisions of the GATS with respect to measures affecting access to and use of public telecommunications transport networks and services. Furthermore, Annex on Negotiation on Basic Telecommunication[9] and Decision on Negotiation on Basic Telecommunication[10] open the door wide on the negotiations for the progressive liberalization of trade in telecommunications transport networks and services. The two primary objectives of the negotiations were to allow more competition in the provision of telecommunications services, and to establish a transparent and predictable framework for trade and investment in telecommunications services. The WTO negotiations concluded on February 15, 1997 with an agreement which came into force on February 5, 1998. The WTO Agreement on Basic Telecommunications Services established commitments to liberalize and open access to telecommunication markets on the part of signatory countries, and created a dispute settlement process which provides the necessary safeguards to ensure that those commitments are respected.

The GATS Member States expect that any offer made in telecommunications services will include binding commitments regarding the provisions of the Reference Paper on

[8] WTO, *The Legal Text: The Results of the Uruguay Round of Multilateral Trade Negotiation* (Cambridge; Cambridge University Press, 2002) p. 314.
[9] WTO, *The Legal Text: The Results of the Uruguay Round of Multilateral Trade Negotiation* (Cambridge; Cambridge University Press, 2002) p. 319.
[10] WTO, *The Legal Text: The Results of the Uruguay Round of Multilateral Trade Negotiation* (Cambridge; Cambridge University Press, 2002) p. 405.

Regulatory Principles that is part of the telecom services Annex, which includes the agreed-upon best practices. These practices are interconnection, competition safeguards, transparency, universal service, public availability of licensing criteria, independent regulatory bodies, and allocation and use of scarce resources[11]. Accordingly, countries, including Palestine, must take into consideration all these practices when they regulate their telecommunication sectors if they want their regulations to comply with international law. In this case, the provisions of independent regulation of the sector and competition safeguards are of particular importance.

Independence of regulation over the telecom sector has two fundamental attributes: independence of the regulator from the industry (private sector), and independence of the regulator from the agency with policy jurisdiction within a given government (the Ministry in our case)[12]. The GATS reaches the first attribute, i.e., independence from a state-owned or state-director "major supplier," which is understood to mean the operator of the public switched telephone network. With regard to competition safeguards, it means that member states must prevent any anti-competitive practices in telecommunication by maintaining appropriate measures for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices and provide them with all the necessary means to operate in equal basis[13]. Anti-competitive practices include engaging in anti-competitive cross-subsidization, using information obtained from competitors with anti-competitive results, and not making available to other services suppliers on timely basis technical information about essential facilities and commercially relevant information which are necessary for them to provide services[14].

2.3. *Telecommunication Law*

The Telecommunication Law No. 3 of 1996[15] was decreed and signed by the late President Arafat on January 18, 1996. It is important to note the fact that this Law was decreed two days before the conclusion of the first Palestinian Legislative Council (PLC) elections on January 20, 1996. This fact raises the question of why the President did not wait for the PLC to operate and thus go through the regular channels of regulation. The President did not wait for the PLC in order to control the negotiation which was taking place between the Presidential Office, represented by his Economic Advisor, and a group of foreign and national investors. In other words, the President did not intend to involve the PLC and its direct supervision in the privatization of the telecommunication sector[16]. This fact has subsequently left the Telecommunication Law and the License Agreement with the reputation that it was purely a business deal concluded without regard for the Palestinian public interest.

The Telecommunication Law consists of 105 articles divided into 15 chapters. These chapters deal with definitions and general rules; the Ministry's tasks and responsibilities; telecommunication networks; frequency management; telecommunication networks license; license renewal, modification and cancellation; type and communication equipments'

[11] The full text of this Regulatory Principles can be found at: http://www.itu.int/newsarchive/press/WTPF98/WTORefpaper.html

[12] Provision 5 of the Regulatory Principles.

[13] Hank Intven and McCarthy Tetrault, *Telecommunications Regulations Handbook* (Washington D.C.: The World Bank, 2000) Chapter 5.

[14] Provision 1 of the Regulatory Principles.

[15] Palestine Gazette, Issue no. 12, 23/04/1996, p. 7.

[16] In this regard, it is important to mention that the President's office has given a Lebanese investor a written promise to grant him the right to operate the telecommunication sector in the Palestinian territories. However, when the President gave that right to Paltel that investor initiated a lawsuit in the American court of New York. The Court's judgment was in his favor, and $18 million USD were taken from the PA bank accounts as compensation.

approval; establishment and restoration of telecommunication lines and telecommunication equipments and their investment; licensee supervision and user protection; telecommunication basic services; independent networks; appropriation, seizure authority, crimes and penalties; and final provisions.

The most important characteristics of the Telecommunication Law are that it has vested ownership of the telecommunication sector in the Palestinian territories in the PA[17]; authorized the PA's Council of Ministers to mandate, exclusively or partially, this sector to private companies[18]; and provided the MTIT with the right to establish, operate and manage telecommunication networks in Palestine and connect these networks internationally[19]. Furthermore, the Telecommunication Law has vested the regulation of the telecommunication sector to the MTIT[20] and the Minister[21]. In this regard, the Minister enacted Decision No. 1 of 1996 regarding Regulation on Wired and Wireless Telecommunications[22], which regulates the conditions for granting an exclusive right on wired and wireless telecommunications in Palestine, the license, telecommunication protection, and telephony system[23].

Reviewing the Palestinian Telecommunication Law in light of international best practices mentioned above is not the immediate intention of this paper. However, discussing the Telecommunication Law in light of the independent regulator and competition safeguards principles is a necessity. The GATS Reference Paper on Regulatory Principles demands the establishment of an independent regulatory authority responsible for the regulation and supervision of the telecommunication sector. This Authority must be independent from the operators (Paltel) and the Ministry (MTIT). Palestine has already achieved the structural separation of the public network operator from the regulator through the privatization of Paltel[24]. If the shareholding and corporate governance arrangements that exist between the PA and Paltel are deemed to meet WTO requirements, then the Reference Paper's requirement of independence will be met.

However, the PA has not met the second attribute regarding the independence from the MTIT by giving the latter the full authority to regulate the telecommunication sector. If the PA intends to fulfill the WTO requirements in this field, it must move the regulatory authority to an independent body. Independent regulation of the sector of the type that investors have come to expect also requires that the regulator be insulated from undue political influence. This expectation has led most countries that have liberalized this sector to establish a regulatory authority that is legally separate from the ministry or agency of jurisdiction for policymaking in the sector[25]. Both the WTO standards and international best practices indicate that Palestine should create a telecommunications regulatory agency that is structurally separate from the MTIT. Consequently, the Palestinian Authority, should it make an offer in telecom services, will be expected to commit to the creation of an independent regulator for telecommunications[26].

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[17] Article 2 of the Telecommunication Law.
[18] Article 3 of the Telecommunication Law.
[19] Article 5 of the Telecommunication Law.
[20] Articles 6 and 7 of the Telecommunication Law.
[21] Article 103 of the telecommunication Law.
[22] Palestine Official Gazette, No. 14 on 27/08/1996, p. 6.
[23] This Regulation consists of 166 articles.
[24] Paltel Report, Palestinian Network Facing Foreign Competition, July 26, 2004.
[25] Such as Jordan, Egypt, and most of the European Union.
[26] Ministry of National Economy, Palestinian National Strategy for Economic Development: Creating an Economically Viable Palestinian State, August 2003.

2.4. The License Agreement

The License Agreement (LA) on the right to establish, manage and operate fixed and mobile telecommunications was concluded by the Ministry of Telecommunication and Post (whose name was changed to the Ministry of Telecommunication and Information Technology in 1999) as the first party and Paltel as a second party. Though the Ministry of Telecommunication and Post was considered the party representing the PA, the LA was signed by the Palestinian Ministry of Finance on November 15, 1996. Depriving the relevant Ministry, with all its specialists, knowledge and experience from signing the Agreement confirms that the LA was not intended to develop the Palestinian telecommunication sector in a manner compatible with the latest technologies and the paramount Palestinian economic and social needs, but was rather purely a business arrangement.

A detailed study of the LA is not the purpose of this paper. However, it is important to reveal its main characters. The LA has given Paltel the right to establish, manage and operate fixed and mobile telecommunications for 20 years[27]. The first 10 years are exclusive over all telecommunication services except the Mobile Voice Telephony, in which its exclusivity is 5 years or 120,000 lines, whichever comes first[28]. On the other hand, the LA gives Paltel the mandate to provide exclusively the following services[29]:

- local and international telephone services
- mobile phone services
- data communications
- Interactive Voice Response
- provide and connect leased lines and circles
- sell, lease and maintain telecommunication terminal equipments
- provide fixed or mobile satellite telecommunication services excluding the PA and its institutions services
- Value added services

Commenting on this provision, it must be mentioned that, except in some developing countries with regard to public companies, no private company has had such broad exclusivity in such an important sector. According to the LA, until November 2007 no other company is allowed to invest in the telecommunication sector. On the one hand, this contradicts Article 6 (b) of the Telecommunication Law No. 3 of 1996, which requires the MTIT to draw up plans that promote foreign investment in the telecommunication sector on a competitive basis, which would lead to better services at affordable prices. On the other hand, such exclusivity will not contribute in the development of the telecommunication sector in Palestine. For example, Paltel monopoly over satellite telecommunications would hinder the development of other telecommunication services connected with it and would also hinder the MTIT's ability to grant licenses to other operators in active broadcasting and receiving, and the ability to connect through Very Small Aperture Terminal (VSAT), which is a satellite earth station with a small antenna, usually six meters or less. Usually used for point-to-multipoint data networks, VSAT has dramatically lowered the costs of satellite communications[30].

With regard to Mobile Voice Telephony, the PA can legally authorize other companies to work in this sector since Jawwal has registered more than 120,000 lines and the 5-year period has already expired. It is important to note that Paltel claims that the 5-year

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[27] The maximum is 20 years as provided by Resolution of the Minister of Post and Telecommunication 19 Regarding the Telecommunication System No. 1 of 1996. Palestine Gazette, Issue no. 14, 27/08/1996, p. 6.

[28] Article 3 of the LA.

[29] Article 2 of the LA, entitled "the License scope".

[30] An interview with Mr. Mahmoud Diwan, Director General of the MTIT in January 2005.

period has not started since the LA deals with exclusivity and the Palestinian telecommunication market has had other operators working next to Jawwal, the Israeli mobile telecommunication companies. According to Jawwal, its 5-year exclusivity period will not start unless the MTIT stops the infiltration of the Israeli mobile telecommunication companies into the Palestinian territories[31]. In my opinion, this claim is illegal and not built on a solid basis; these companies were active in the PA before the LA because they are working in the Palestinian territories illegally and the MTIT has not had the ability and the resources to stop them. Finally, and most importantly, Jawwal has registered more than 120,000 lines, therefore 5-year period is no longer valid.

Another important comment in this regard is that the MTIT is forced to give Paltel, free of charge, the radio frequency spectrum necessary to provide the telecommunication services mentioned above[32]. Giving Paltel a free radio frequency spectrum contradicts all the arrangements in the neighboring countries were companies must pay for the use of a radio frequency spectrum. The MTIT has estimated, taking the Jordanian and Lebanese examples[33] and depending on the Palestinian Telecommunication Law, that the lost revenues from the free use of the Palestinian Radio frequency spectrum by Paltel have exceeded 5 million USD up until the end of 2003.

The final comment is that if there is a contradiction between the LA and the Decision No. 1 of 1996 regarding Regulation on Wired and Wireless Telecommunications, the latter will prevail[34]. Moreover, the enactment of a new telecommunication law or any amendments to the current Telecommunication Law must not alter nor affect the LA[35]. In other words, the LA has been legally put in a level higher than the Telecommunication Law and its relevant regulation. This provision is illegal and contradicts the most important legal principles, which are the rule of law and separation of powers principles. It is absolutely absurd to give an agreement between the Executive Authority and a private company a legal power more than the law, which is enacted by the Legislative Council to achieve public interest. Law has the power to amend, cancel and approve any of the Executive Authority powers and responsibilities and thus any decision taken or agreement concluded by it. Accordingly, any amendment to the current Telecommunication Law or the enactment of a whole new law directly affects the LA and Paltel has no right to contest it as long as it serves public interest.

On the other hand, the Licensed Agreement has given the MTIT some powers and responsibilities in order to oversee the implementation of the Agreement. According to the LA, the MTIT has the following powers and responsibilities:

- The minister must, within 60 days of Paltel request, renew the LA for another 20 years if Paltel has adhered to the License's obligations and terms, if such renewal would serve the Palestinian public and the telecommunication sector.
- Paltel cannot cancel public telephone networks without the approval of the Ministry.
- The Ministry must support Paltel internationally in order to fulfill its mandate.
- The Ministry is the only entity to represent Palestine internationally.
- Paltel cannot determine nor change its list of prices or the way to collect them without the approval of the Ministry.
- The Minister has the right to change the technical specifications and standards every 5 years in a manner compatible with the best international standards.

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[31] An interview with Mr. AbedelMalek Jaber, President of Paltel, Al-Quds News Paper, Issue No. 12870 on 17/01/2004.

[32] Article 12 (1) of the LA

[33] For example, Jordan leases each radio frequency channel related to mobile voice telecommunication for around $7100 yearly.

[34] Article 23 (1) of the LA.

[35] Article 23 (5) of the LA.

- The Ministry must support Paltel in obtaining an international code from the International Telecommunication Union (ITU).
- The Minister must, within 30 days, approve or recommend new services in Paltel in relation to its users.
- The Ministry has the right to terminate the LA after a 60 day notice if Paltel approved; Paltel bankruptcy; the constant violation of the terms and conditions; did not pay the License fees; Paltel transferred the License or brought new partners; or if Paltel violated the License terms.

Furthermore, Paltel must respect the following obligations, duties and responsibilities:

- Paltel has the full right to construct, install and operate telephone and mobile networks including the exchanges, earth and air cables and other related equipment, as well as the right to use this network for telecommunications services.
- Paltel should pay the PNA 7 percent of its annual operating revenues of any subsidiary to be established.
- Paltel must develop and expand the private and public telephone network.
- Paltel must adhere to the Ministry of Telecommunication plan.
- Paltel has the full right to negotiate and conclude regional and international interconnect agreements.
- Paltel, after obtaining the approval of the Minister of Telecommunication, can determine suitable charges and prices for all the provided services and the best way to collect them.
- The provided services must be compatible with the recommendations of the ITU-T and ITU-R, and those issued by the European Community for Mobile Telecommunication.
- Paltel must, within 60 days of receiving a notice from the MTIT, correct its violation of the license conditions and terms.
- Paltel cannot sell its capital to foreign investors without the approval of the Palestinian President if such transfer would give them a total of 30 percent of its voting power.
- Paltel cannot transfer the License without the approval of the Council of Ministers.
- In case of a conflict on the implementation of this License, Paltel and the Ministry must first negotiate a resolution. If they can not reach an agreement within 30 days both or each party has the right to refer to arbitration in which a judgment is final.

3. The Telecommunication Players

Since the signing of the Declaration of Principles between the PLO and Israel resulting in the establishment of the PA, a number of parties and institutions have influenced the telecommunication sector in Palestine. The extent of the influence of each party has changed from time to time depending on the particulars of the policy or regulation matters in reference to the overall political, social and economic aspects involved. For example, while the technical details of the licensing agreement of the Paltel was handled by the MTIT, the corporate structure of the company and the limits of its monopolistic activities was decided by the office of the President, through his economic advisor, and influential private sector players[36]. External to national institutions and players, the Ministry of Communication of Israel continues to play a role in the Palestinian telecommunication sector by virtue of the interim agreement governing the relationships between Israel and the PA. Its role is particularly prominent with matters that involve international connectivity and spectrum management as the membership of Palestine in the International Telecommunication Union

[36]Palestinian Territories Master Report: http://www.eu-esis.org/esis2reg/PAreg1.htm

(ITU) is less than that of a sovereign state.

3.1. Ministry of Telecommunications and Information Technology (MTIT)

The most important player in the telecommunication sphere in Palestine is the MTIT, which was established along with other PA institutions as a result of Oslo Agreement. The MTIT is the official owner of the telecommunication sector and has the right to establish, operate and manage telecommunication networks in Palestine and connect these networks internationally[37]. Its declared responsibilities and activities were set up in Article 6 of the Telecommunication Law. These responsibilities are:

1. To prepare the general policy of telecommunication in Palestine, submit it to the Council of Ministers for approval, and work on its development in order to meet the requirements of economic and social development in Palestine.
2. To draw up plans that promote foreign investment in the telecommunication sector on a competitive basis, which would lead to better services at affordable prices.
3. To follow up the implementation of the relevant parties of the PA's international commitments regarding telecommunication.
4. To safeguard the PA's interest with foreign countries, regional and international organizations, unions and specialized committees in the field of telecommunication in cooperation with other ministries and relevant agencies.
5. To develop the telecommunication sector according to the latest telecommunication technology developments.
6. To spread public awareness of the importance of the telecommunication sector and provide different telecommunication services.
7. To protect the interest of telecommunication users and oversee the performance of the license telecommunications providers and take necessary measures in order to guarantee their full compliance with the license, including the level and quality of services.

In order to achieve the above, Article 8 of the Telecommunication Law has authorized the MTIT to do the following:

1. Implement the telecommunication official policy.
2. Oversee financially, administratively and technically any future public telecommunication company and set up its duties and operation conditions by overseeing its adherence to the regulations or making suggestions to the Council of Ministers on the provision of the license and its conditions and make sure that investors from the private sector are adhering to the license conditions and the policy of international tariffs.
3. Make recommendation to the Council of Ministers concerning the granting of licenses to establish, operate and administer public networks and provide telecommunication services to users.
4. Approve licenses to establish, operate and administer private networks and determine their conditions.
5. Give the necessary approval for the use of the radio frequency spectrum related to telecommunication.
6. Prepare the criteria and bases to determine the provided services' prices offered to Users by Licensee and make recommendations to the Council of Ministers to adopt these criteria and bases and determine the services' prices in case a monopoly is given.
7. Make recommendations regarding the appropriation of land for the benefit of the licensees, pursuant to the governing legislation.

[37] Article 5 of the Telecommunication Law.

8. Prepare the Ministry's general budget and transfer it to the Council of Ministers for approval.
9. Appoint the necessary advisory committees to assist the Ministry in achieving its mission.
10. Consider and resolve objections submitted to the Ministry.
11. Establish the technical specifications and standards for connecting telecommunications equipments to public telecommunications networks.
12. Approve a national numbering plan for Public Telecommunications Services consistent with this Law.
13. Determine the prices of all services provided by the MTIT.
14. Regulate the import and usages of Telecommunication Terminal Equipment for individual and private uses, or use in special zones, and to monitor such usage.
15. Oversee the use of the different radio frequency spectrum and their equipments in accordance with the effective standards set up by international agencies responsible for drawing standards and metrology.
16. Adopt technical rules and standards for the interconnection of Telecommunication Terminal Equipment with the Public Telecommunications Network or with electromagnetic wave equipment.
17. Publish an annual report describing the MTIT's activities, achievements and all developments regarding telecommunication services and the future plans of the MTIT.
18. Make a recommendation to the Minister to announce the list of all technical terms used in the telecommunications sector and the meanings assigned to them in the Palestinian territories, and to publish them in the Official Gazette.

Accordingly, the MTIT is responsible for the determination of all matters regarding the telecommunication sector in Palestine, which varies from deciding the fundamental policy issues to regulatory frameworks as well as day-to-day monitoring of the sector. The MTIT gave up part of its responsibility when it privatized the telecommunication sector in 1995 and gave a private company (Paltel) the exclusive right to operate this sector. In other words, the official policy of the PA is to engage the private sector in all the operational aspects of the telecommunication market in Palestine, while at the same time maintaining the role of policy making and regulatory and monitoring functions within the MTIT[38].

Recognizing the fact that investing the regulation authority of the telecommunication sector in the MTIT contradicts the best international practices settled by the WTO, the Palestinian Council of Ministers decided to establish the Palestinian Telecommunication Regulatory Authority (TRA) on August 2, 2003. The MTIT drafted TRA tasks[39], and the Minister of MTIT will be Head of the Authority. The Authority will share with MTIT the responsibility for the regulation and administration of the telecommunication sector[40]. Accordingly, the TRA must, in principle, ensure the provision of high quality telecommunication services to all users at just, reasonable and affordable prices; and work with other relevant parties to liberalize the telecommunications sector in an open, independent and transparent manner in order to create a suitable and equal environment for competition and investment. In order to achieve this major goal, the TRA would have the following responsibilities[41]:

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[38] Interview with Adv. Nafeth Barakat, the legal consultant of the MTIT.

[39] These tasks are identical to the Jordanian Telecommunication Regulatory Authority introduced by the Jordanian Telecommunication Law No. 13 of 1995. Jordan Official Gazette No. 4072, 01\10\1995, p. 2939.

[40] For more about these tasks and the regulation involved as a whole (text in Arabic) see the official website of the Ministry at: http://www.mtit.gov.ps

[41] Article 8 of the draft Regulation.

1. To regulate telecommunications services in Palestine in accordance with the established general policy so as to ensure the provision of high quality telecommunications services at just, reasonable and affordable prices; and to make possible the optimal performance of the telecommunication sector.
2. To establish the basis for regulation of the telecommunications sector, in accordance with the approved general policy, in such a way that services meet the comprehensive developmental needs of Palestine; in accordance with rules and instructions issued by the Board for this purpose.
3. To specify the minimum level of service quality which must be offered by licensees to meet the needs of Users.
4. To propose draft laws dealing with the telecommunications and information technology sectors, to present them to the Ministry, and to prepare the bylaws and issue the instructions related thereto.
5. To protect the interests of users and oversee the actions of persons and Licensees to ensure that the conditions of Licenses are observed, including specified service standards, service quality, and prices; and to take the necessary steps in this regard to provide for the punishment of those who violate these conditions in accordance with the relevant Palestinian laws.
6. To stimulate competition in the telecommunication sector, relying on market forces, and so regulating them to ensure the effective provision of telecommunication services and to ensure that its regulations are effective and efficient; to forbid anti-competitive behavior or practices; to forbid actions by any person to abuse a dominant position in the sector, and to take all necessary actions in this regard.
7. To participate in the representation of Palestine in meetings, conferences, delegations, workshops and other international gatherings having to do with telecommunication.
8. To encourage self-regulation by the telecommunication sector.
9. To prepare and adopt the terms and conditions and criteria for the granting of Licenses for networks and telecommunications services, and for the use of the radio frequency spectrum.
10. To manage the use of the Radio Frequency Spectrum in accordance with the International Telecommunication Union, including:
    A. Preparing and maintaining the "National Table of Frequency Allocations."
    B. Preparing the "National Plan for Frequency Assignment" and "National Register of Frequencies," in coordination with the relevant governmental agencies.
    C. Maintaining the civilian portion of the Radio Frequency Spectrum.
11. To regulate access to telecommunications networks and conditions of interconnection therewith in accordance with instructions issued by the Authority for this purpose, and to approve the interconnection agreements; and to ensure that there are no infringements in these agreements, and to ensure that there are no infringements between these agreements and the above instructions, taking into consideration the terms and conditions of any License previously granted by the Authority or any agreement with the Government entered into prior to the effective date of Telecommunication Law No. 3 of 1996.
12. To establish technical rules and standards for the interconnection of wire line or wireless equipment, including Telecom Terminal Equipment, with the Public Telecommunications Network, and to set the regulation procedures for importing such equipment into Palestine with regard to principles prescribed in the effective Standards and Metrology Law.

13. To grant the necessary type approvals and regulate the import and usages of Telecom Terminal Equipment for individual and private uses, or use in special zones, and to monitor such usage.
14. To gather information related to the telecommunications and information technology sectors in order to prepare and publish reports, pamphlets, and instructions for users, as well as to prepare media programs to increase the public's awareness of the importance of these sectors and their positive impact on the economic and social development of Palestine.
15. To prepare and publish an annual report describing the Authority's activities, achievements, technical development, and any changes in the general policy relating to telecommunications services, and the future plans of the Authority.
16. To assess the need for the adjustment of the level of or regulation of any telecommunication service, or specific types or groups thereof, with regard to competition or any other factor that may require such adjustment or forbearance, and to recommend the same to the Board for approval.
17. To follow up and look into any complaints raised by the public.
18. To inspect the Licensees in order to guarantee the compatibility of their works with the approved standards.

According to these tasks and responsibilities, the MTIT will be left with the following duties[42]:

1. To prepare the general policy of the telecommunications sector in Palestine, and submit it to the Council of Ministers for approval, and to set a biennial national strategic plan for these sectors in accordance with this policy.
2. To work on expanding the scope of coverage of telecommunications and information technology services in order to meet the requirements of economic, social, cultural and scientific development in Palestine.
3. To follow up the implementation of Palestine's commitments in international treaties in the telecommunications sector.
4. To represent Palestine's interests with state, regional and international organizations, unions, and commissions concerned with telecommunications.
5. To work on expanding all kinds of telecommunication services in all parts of Palestine and to promote the advancement of research and development in the areas of telecommunications.
6. To oversee the preparation of draft laws and regulations in the areas of telecommunications, and to present them to the Council of Ministers.
7. To strengthen competition and investment in the telecommunication sector and to prevent monopolies in this sector.
8. To protect users' interests and the licensee working in telecommunication in order to guarantee the provision of best levels of services.
9. To strengthen the competitive position of Palestine internationally in the area of telecommunication.
10. To keep and maintain the National Plan for Frequency Assignment and the National Register of Frequencies as a national treasure as the national telecommunication network.
11. To help the Telecommunication Regulatory Authority and the relevant security apparatuses to prepare the National Plan for Frequency Assignment and the National Register of Frequencies.
12. To collect relevant information from the Authority and other government departments

[42] Article 7 of the draft Regulation.

or private entities for the purpose of accomplishing the Ministry's duties.

13. To work towards the elimination of impediments in the telecommunications sector through cooperating with the Authority and other parties, so that the Ministry can discharge its duties.
14. In cooperation with other relevant parties, to set up the rules and special standards for the protection of users and the environment from the electromagnetic sphere.
15. To propose draft laws dealing with the telecommunications and information technology sectors, to present them to the Ministry, and to prepare the bylaws and issue the instructions related thereto.

3.2. The Telecommunication Company (Paltel)

The PA privatized the telecommunications sector in 1995 and on November 15, 1996 Paltel was established as a public shareholder company with the expressed goal of developing the telecommunications sector via a LA. Paltel received a 20-years license to operate fixed line services; the first 10 years are exclusive, and cellular phone service for 5 years or 120,000 lines – which ever comes first – in the WBGS[43]. Paltel has about 10,000 private and corporate shareholders and its shares are traded on the nascent Palestinian Securities Exchange in the WB city of Nablus. Paltel shares have been the driving forces behind activities on that exchange; it is also one of the largest employers in the PA with a work force of 1,796 people. In 1996 the company's paid up capital stood at Jordanian Dinars 45 million, equivalent to $65 million USD. The paid up capital was raised to JD 67.5 million or $96.4 million USD in 1999. When Paltel took over the telecommunication sector it was in a very poor state, particularly in regard to telephone service, but over the last seven years the company has invested huge amounts to improve services by introducing cutting edge technologies. The company built the infrastructure and equipped an advanced digital network that enabled Palestine to re-connect with the world through a distinctive leap that resulted in achieving a teledensity of 10 percent and its services covering approximately 90 percent of the Palestinian territories. The price of a new line dropped by 75 percent, and the lead-time for a new telephone dropped from one year to 48 hours. The total business and personal lines in Palestine are now over 400,000[44].

In order to fulfill its mandate of providing mobile phone services[45], Paltel established Jawwal, the first Palestinian cellular service provider, in the summer of 1999. In December 2000, Jawwal developed into an independent, private corporation[46]. In this regard it is important to note that the establishment of Jawwal as an independent private corporation contradicts both the Telecommunication Law and the LA. Article 37 of the Telecommunication Law stipulates that the exclusivity right is personal and cannot be transferred to others without the written approval of the MTIT. Furthermore, Article 12 of the Decision on the Regulation on Wired and Wireless Telecommunication states that the owner

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[43] Sam Bahour The Palestine Chronicle, Tuesday, August 10, 2004.
http://www.palestinechronicle.com/story.php?sid=20040810070814226

[44] The Palestinian Contribution for the World Summit on the Information Society, Geneva 2003, Document WSIS-03/GENEVA/CONTR/07-E. In this regard, it is important to note that the MTIT has contested this number.

[45] Article 2 of the LA.

[46] As a result of Jawwal separation, during 2000, the PNA became entitled to an additional license and concession cost of $4 million USD (JD 2,836,000). During 2003, Paltel and the PNA reached an understanding to settle all amounts outstanding between the two parties for the years from 1997 to 2002, under this agreement: a) Paltel will pay a license fee of 7 percent of cash collection from all types of operating revenues instead of 7 percent of certain billed operating revenues, which was previously applied. b) The value added tax (VAT) will be levied on cash collection from all types of operating revenue except for international interconnect revenues. c) All amounts due to Paltel from PNA will be settled. d) Starting January 1, 2003, Paltel will pay the VAT and the license fee on a monthly basis based on billed revenues.

of the exclusive right has no mandate to transfer it to others without the approval of the MTIT and without such approval the agreement would be null and void. Finally, the LA has stated in Article 18 that Paltel has no right to transfer any of the LA exclusive rights to others without the written approval of the Council of Ministers. Thus it could be concluded that the establishment of Jawwal as an independent company is an explicit transformation of the mobile phone services to another entity foreign to the LA, which indeed requires the approval of the Council of Ministers. This act on the side of Paltel is a clear violation of the LA obligations.

Jawwal invested over $140 million USD to establish a cellular service network that covers all of the WBGS. Jawwal aspires to make mobile communications accessible to all Palestinians by improving service, expanding its network and signing international roaming agreements to ensure comprehensive international roaming services. Today, Jawwal provides its customers with a wide range of data services from entertainment and horoscopes to music, sms, email and other services. Faced with tough – even illegal – competition from four Israeli operators, Jawwal has doubled the number of subscribers in less than one year and maintains the biggest market share. Today, there are over 310,000 subscribers on Jawwal's network[47].

The competitiveness status of Jawwal, however, is constrained more by the quality of its services than by prices. The problem here is two fold: lack of service in numerous geographic locations, and intermittent service during peak hours of the day. Both problems are a consequence of Israeli obstacles. The limited geographic coverage of Jawwal is a direct result of the restrictions imposed by Israeli authorities on establishing relay towers in all necessary locations. This poses a particularly serious constraint, especially given the fact that more than 70 percent of the WB area is under direct Israeli sovereignty. Jawwal technical capacity has been further constrained by Israel's refusal to release several pieces of vital technological equipment, which have been held in Israeli ports since October 2001. Israeli authorities rationalize their restrictive measures on undefined security grounds, but the protection motives in favor of Israeli cellular firms are not hard to detect. These two important problems will definitely serve the Israeli cellular companies directly and indirectly. Users will find it easier to use the Israeli companies, at the cost of Jawwal, since the former coverage is better than that of the latter. Indirectly, for those choosing to use Jawwal, whenever they move to areas outside the coverage area of Jawwal their mobile phones will automatically or manually be shifted to Israeli companies, thus financially benefiting these companies at the cost of Jawwal.

3.3. The Israeli Telecommunication Companies

Israel continues to play a significant role in the Palestinian telecommunication sector by virtue of the various agreements governing the relationships between Israel and the Palestinian Authority. The Oslo Agreement has given the Israeli Ministry of Communication some role in the telecommunication sector in Palestine. The most important role is to grant the Palestinian Authority permission to use either pre-agreed frequency ranges or approve new ones in response to requests stemming from the MTIT. Furthermore, it still holds responsibility for microwave relay stations within the WB that are either still under Israeli security control or are located within Israeli settlements and military locations.

A residue of the past Israeli control of the telecommunication network in Palestine is its dependence on the Israeli network in terms of regional transport and international connectivity. This has resulted in an implied influence of Bezeq (the Israeli telecommunication company). In order to fulfill its mandate established in Section (D) of Article 36 of Annex III to the Oslo Agreement, Paltel has signed a Transit and Hubbing

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[47] An interview with Mr. AbdelMalek Jaber, President of Paltel, Al-Quds News Paper, Issue No. 12870 on 17/01/2004.

Services Agreement with Bezeq, Barak and Goldenlines in 2002. Accordingly, these companies shall provide Paltel with Transit and Hubbing Services for traffic to and from various destinations around the world for agreed charges and rates paid by Paltel. In this regard, they can change any or all of their rates and/or destinations by providing Paltel with a written notice at least ten days in advance.

Nonetheless, Paltel has taken significant steps towards eliminating this influence by deploying a fiber optic/microwave transmission network. It is expected that Paltel will shortly re-route its inter-regional transport through this network. Additional steps are underway in order to minimize the dependency in international connectivity. Paltel is in the process of erecting satellite earth stations. It is important to note that the Israeli influence on the telecommunication sector is expected to diminish if the negotiations regarding the final political status of Palestine resume since Israel is not allowing Paltel to use such alternative networks[48].

With regard to mobile phone companies, in Israel there are four mobile phone companies: Orange, MIRS, Cellcom and Pelephone. These companies are working in Israel and are allowed to provide services to all Israelis located in the WBGS as provided in Article 36 (a)(2) of Annex on telecommunication. However, these companies are not allowed in any cases to serve the Palestinian population without the prior consent of the PA as provided in Section 4 (B) of Article 36, which states that operators and providers of services in the WBGS shall be required to obtain the necessary approvals from the Palestinian side.

In this regard, Israel is allowing its cellular operators to operate within the Palestinian cities and towns in clear violation of the Oslo Agreement and in blunt disregard to internationally recognized agreements, including the World Trade Organization treaties to which Israel is a signatory. These Israeli mobile companies are working in the Palestinian telecom market without attaining the necessary approvals and thus breaching the Palestinian Telecommunication Law.

Israeli cellular operators have installed a comprehensive network covering the entire Palestinian area. These firms place their equipment inside the illegal Israeli settlements, under the pretext of serving the settlers, but in reality position their equipment and provide it with excess capacity to cover every Palestinian community. This is easily done, given that the settlements are usually located on the hilltops next to Palestinian population centers and are well protected by Israel's military occupation forces. Furthermore, besides placing towers and equipment in settlements, and recently on contiguous Palestinian lands, these Israeli companies have flooded the Palestinian marketplace with pre-paid scratch cards to market their services. Capitalizing on the PA's inability to regulate its market, the Israeli companies continue to dump their services in the WBGS. The pricing schemes for these illegal services directly threaten the Palestinian operators' ability to survive. Faced with four illegal operators working without licenses and without any type of regulation – commercial, environmental, or otherwise – the Palestinian operator competes against tremendous odds[49].

Such illegal activities are harming Paltel and imposing unfair competition within the Palestinian mobile telecommunications market by illegally marketing tax-free unlicensed Israeli services while denying Palestinian reciprocation. The total Palestinian Authority market of cellular subscribers today is around 770,000; Jawwal has 44 percent of the market and has been losing market share to Israeli cellular operators during the past two years. Thus the Israeli share of the mobile telecommunications market stands at 56 percent of the total market. Since the telecommunication market has been solely granted to Paltel, Jawwal has already initiated legal action in the Palestinian courts against two of these Israeli firms with action against the other remaining two in the process for breaching its five year monopoly

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[48] An interview with adv. Murad Fares, internal legal consultant of Paltel.

[49] Paltel Report, Palestinian Network Facing Foreign Competition, July 26, 2004.

with the PA. The lawsuit is against Pelephone for $160 million USD and against Cellcom for $275 million USD[50].

4. The Reality of Telecommunication in Palestine

The current legal reality of telecommunication in Palestine created by the Oslo Agreement, the Telecommunication Law, the LA and the continued Israeli occupation of the Palestinian territories has given telecommunication a unique role to play in the Palestinian politics and economy. The Oslo Agreement, on the one hand, has given the PA partial control over the telecommunication sector. On the other hand, Israel has kept the international link under its control. Furthermore, the PA, depending on the Telecommunication Law, has given Paltel an exclusive right to exploit the telecommunication sector, but by doing so it has undermined competition rules and put the whole sector at the mercy of Paltel.

4.1. The Political Reality

Politically speaking, the Oslo Agreement introduced new realities to the Palestinian territories. When the Israeli-Palestinian (peace) negotiations started in 1993, it was thought that they would, in the end, free Palestinians and their interests from Israeli control. This wishful thinking gradually vanished. The negotiations proved that Israel was eager to maintain the status quo of the Palestinian territories in any concluded agreement with the PLO. Reviewing the Oslo Agreement reveals that Israel has, to a large extent, succeeded in maintaining the Palestinian total reliance on Israel in almost all sectors with an international dimension. For example, Israel has retained powers and responsibilities for all economic activities with an international dimension, such as import and import tax policy, indirect taxation and the issuance of a Palestinian national currency. On the other hand, Israel transferred to the PA full powers and responsibilities for all economic activities with a local dimension, such as monetary and financial policy, and direct tax and insurance issues[51].

Taking into consideration Article 36 on telecommunication in the light of the above reveals that Israel has followed the same pattern with telecommunication. On the one hand, Israel gave the PA full powers to build, operate and manage public and private telecommunication networks in all Palestinian territories, except in Area C (Settlements and military camps). On the other hand, Israel deprived the PA of the right to establish its own international connections and forced it to sign an agreement with Israeli telecommunication companies for that purpose.

The PA and Paltel thus have no right to establish independent international connections without the approval of Israel. That explains the fact that Israel has rejected Paltel's accord with the Hashemite Kingdom of Jordan and the Arab Republic of Egypt on a project to connect Palestine to the outside world via a fiber optics network and to erect satellite earth stations. It also explains the Israeli fury over the ITU's assignment of an international code number to Palestine, which runs apposite to the Israeli planning.

In this regard it is important first of all to mention that the Plenipotentiary Conference of the International Telecommunication Union (Minneapolis, 1998) has accepted Palestine as an observer, and it was assigned (970) as an international access code[52]. That means that the ITU applied the Administrative Regulations, and related resolutions and recommendations, to the PA in the same manner as they are applied to administrations as defined in No. 1002 of

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[50] It was estimated that due to the Israeli telecommunication companies' illegal activities in the PA territories, Paltel and Jawwal lost more than 1.8 billion NIS.

[51] For more see, Samer FARES, *A Comparative Legal Analysis of Capital Movements and Current Payments in International Law, the European Union, Jordan and Palestine*, PhD Thesis, Ghent University, Belgium, 2003, p. 219.

[52] So far 122 countries have used this code.

the Constitution, and the General Secretariat and the three Bureaux shall act accordingly, in particular in relation to the international access code, call signs and the processing of frequency notification assignments[53]. That means that Palestine may participate in all ITU conferences, assemblies and meetings with the following additional rights:

- the right to raise points of order related to the proceedings on Palestinian and Middle East issues, provided that the right to raise such a point of order shall not include the right to challenge the decision of the presiding officer;
- the right to co-sponsor draft resolutions and decisions on Palestinian and Middle East issues; such draft resolutions and decisions shall only be put to vote upon request from a Member State[54].

For its part, Israel has objected to the outcome of this conference. In particular it has opposed the assignment of an international telephone access code to areas under the civilian jurisdiction of the PA. It has claimed that there is no jurisdiction at present under ITU regulations for the implementation of a separate international country code to be utilized for the areas under Palestinian civilian control. Such implementation would also be incompatible with the provisions of Article 36 (D)(5) (c) of the Oslo Agreement, which states that the introduction of an international code for the Palestinian side is subject to agreement between Israel and the Palestinians. It should be noted that the ITU has already taken the highly unusual step of setting aside an international country code for future Palestinian use, a step which Israel strongly opposes as prejudicing the outcome of current and future negotiations between the two parties.

Furthermore, it has opposed the request to alter the legal status of the Palestinian observer delegation in ITU. It has claimed that the legal status of the PLO observer delegation in ITU is extremely well-defined in ITU Council Resolution 741 and rooted in three UN General Assembly resolutions, which are applied in a consistent and unified manner throughout the UN system. The acceptance of an entity which is not a State would require, as a prerequisite, changes to these documents. According to Article IX (5) of the Oslo Agreement, the PA does not have powers and responsibilities in the sphere of foreign relations[55]. Consequently, it cannot become a member of the ITU. Furthermore, Article XXXI (7) of the Oslo Agreement stipulates that neither side shall initiate or take any step that will change the status of the WBGS pending the outcome of the permanent status negotiations. Therefore, the PLO's status as observer in the ITU may not be upgraded, since such would imply a change in the status of the WBGS. It follows, then, that granting

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[53] This decision has been taken in accordance with a) The Charter of the United Nations and the Universal Declaration of Human Rights; b) Resolution A/52/250 of the United Nations General Assembly relating to the participation of Palestine in the work of the United Nations; c) Resolutions 6 and 32 of the Plenipotentiary Conference (Kyoto, 1994); and d) Resolution 18 of the World Telecommunication Development Conference (Valletta, 1998). And taking into consideration a) That the basic instruments of the Union have as a purpose to strengthen peace and security in the world by means of international cooperation and better understanding among peoples; b) ITU needs to have a universal character, considering further that many, but not all, ITU Member States recognize Palestine as a State, resolves that pending any further change in the status of Palestine in ITU. For more see the official website of the ITU: http://www.itu.int

[54] Document number 126 of the ITU.

[55] Article IX (5) of the Interim Agreement gave the PLO the right to conduct negotiations and sign agreements with states or international organizations for the benefit of the PA in the following cases only: (i) Economic agreements as specifically provided in Annex V of the Interim Agreement; (ii) Agreements with donor countries for the purpose of implementing arrangements for the provision of assistance to the PA; (iii) Agreements for the purpose of implementing the regional development plans detailed in Annex IV of the Declaration of Principles or in agreements entered into the framework of the multilateral negotiations; and (iv) Cultural, scientific and educational agreements. All agreements dealing between the PA and representatives of foreign states and international organizations, as well as the establishment in the West Bank and the Gaza Strip of representative offices are permitted.

membership in the ITU to either the Palestinian Council or to the PLO would result in a serious breach of the Interim Agreement.

Israel has been trying not to internationalize the Israeli-Palestinian conflict, giving the impression that Palestine is an Israeli internal affair. An independent Palestinian telecommunication network does not play into that vision. Thus, Article 36 has served the Israeli interest by restricting Palestinian international powers. Telecommunication international independence from Israel requires the PA to renew negotiations with Israel.

4.2. The Economic Reality

Economically speaking, the Telecommunication Law and the LA have managed to build a devastated Palestinian telecommunication sector out of nothing. Paltel has managed, in a relatively short period of time, to connect most of the Palestinian territories in a modern wired and mobile telecommunication networks. This has gained great importance for the time being as a result of the transformation of Palestinian areas into tiny islands and isolated cantons by erecting military checkpoints, imposing siege and continuous closures, and building a racist apartheid wall around Palestinian communities restricting the free movement of people and goods. As a result, the use of telecommunication and information technology applications and services became Palestine's nerve and principle means of communication and interaction among Palestinians.

On the other hand, the LA has put some constrains on the development of the telecommunication sector. The LA has meant that no other company can invest in the telecommunication sector as long as Paltel has not had finished its exclusivity according to the LA, which means that Paltel, and its sister company Jawwal, are the only companies responsible for the development of the telecommunication sector in accordance with the MTIT's telecommunication plan[56]. In this regard, Paltel is not providing all the telecommunication services stipulated by the LA, such as Interactive Voice Response service, and did not do enough to develop satellite services.

It is well known that the best way to develop telecommunication services is to provide an open market for all, where users could choose between many operators based on the best services. The philosophy of "one company for one market" will never lead to the development of the telecommunication sector. Since Paltel is the only telecommunication company in Palestine, it has no reason to develop telecommunication services as long as it can gain profits without spending. The current monopoly of Paltel in the Palestinian telecommunication market is strengthening its role and thus making it difficult for other companies to compete with it in the future.

The one company for one market philosophy moves the role of developing the telecommunication services from market forces to the MTIT. The MTIT, on the one hand, prepares the proper telecommunication development plan and, on the other hand, must closely follow up the implementation of the LA in order to guarantee the development of the telecommunication sector as planned. Reviewing what has been achieved so far in the Palestinian telecommunications sector reveals that the MTIT has not done enough to develop telecommunications in Palestine. Furthermore, under the current circumstances it would be difficult for the MTIT to play this role, which negatively affects the telecommunication sector.

The exclusivity of Paltel, the role of the MTIT, and the development of the telecommunication services can be better explained by following the current debate on the provision of internet in Palestine[57]. Up until January 1, 2005, 11 internet companies provided

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[56] Article 5 of the LA.

[57] This part was written as a result of a legal debate organized by the writer on the legal framework of internet in Palestine and its consequences, which was concluded on Monday, February, 21, 2005. The speakers were adv.

internet in the WBGS[58]. These companies provided internet through leased lines from Paltel and sold their services through pre-paid cards or monthly subscriptions. Although the quality of these services was almost identical since they all buy it from the same source, they competed with each other in the Palestinian internet market by providing their users with the cheapest prices and some incentives such as an email account and a free website.

In 2004 Paltel reached an agreement, entered into force on January 1, 2005, with the MTIT to allow Subscription Free Internet (SFI)[59]. SFI will provide special access number (i.e., 010 800 800) in which users can call from anywhere in Palestine without any subscription requirements for 1,59 NIS, taxes included, per hour[60]. This call will be charged directly to the end user's phone bill. Moreover, the first three minutes must be free as a dial-up attempt, which was not included in the first system. The MTIT's viewpoint is that internet service will be cheaper, faster and more accessible to everybody with a phone line, which will indeed double the number of users in the Palestinian territories and thus contribute in the development of Palestine. Furthermore, in order to help each house access the internet, the MTIT has agreed with Paltel that the latter provides each house the opportunity to buy a PC and pay its value over a one-year period through the telephone bill (a PC for every House Initiative)[61].

The Internet Service Providers (ISP) and users in general were not happy with this agreement and tried their best to stop it. They even challenged this agreement in front of the Palestinian Legislative Council, in which an investigation was initiated[62]. The ISPs' position was that the internet is a very important service and essential to the development of the Palestinian economy and society and thus no one company should monopolize it. In order to satisfy the ISPs, Paltel has agreed with the Palestinian Information Technology Association (PITA), which includes all the ISPs, to sell these companies 180 internet lines. The ISPs can then market these lines in the internet market and compete with each other accordingly. The ISPs have agreed with Paltel that the latter will transfer to the internet providers 30 percent of the collected fees[63]. In other words, everyone becomes a Paltel client.

Some users were happy with the agreement since it was proven that SFI is easier, faster and, most importantly, cheaper than the old system. However, others were unhappy for the following reasons[64]:

1. The SFI is a good system but in its present form it would lead to the monopoly of the Palestinian internet market. It would have been better for Paltel to reduce the internet prices to the ISPs for the latter to reduce their internet service to the users. This system would have kept competition between the ISPs.
2. The SFI will not contribute in the development of the internet service in Palestine since it depends on the dial-up system, which is old, slow and inefficient. Paltel will not find a reason to introduce other better services such as ADSL, cables, Wireless connection and others.

From a user's perspective, the most things users care about are how service is

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Haythem Zuabi, Legal Consultant of Paltel, adv. Nafeth Barakat, Legal Consultant of the MTIT, Tareq Ma'yeh-PITA, and Omar Sahilli- Palestine Internet Society.

[58] Interview with Nehad Awad, Internet Provider.

[59] The MTIT has copies this system from Egypt.

[60] The 1, 59 NIS per hour is cheaper than the prices users used to pay for the same time.

[61] The MTIT will provide the PCs to Paltel in accordance with a general bid in order to prevent Paltel from monopolizing the PC market.

[62] The PLC has conducted an investigation with the Minister of the MTIT and listened to PITA and the internet users, at the end the PLC approved the agreement.

[63] PITA has emphasized the fact that this agreement should maintain the right of ISPs to provide the monthly subscription choice to their users.

[64] For more about this position see the website of the Palestinian Internet Society: http://www.isoc.ps

provided and its quality and price. With regard to how service is provided, there is little difference between the old and new systems. The old system depended on the ISPs leasing their internet lines from Paltel and selling them back to users through various ways, while the new system depends on selling the internet lines directly to users and thus bypassing the ISPs. In other words, it has become easier and less complicated than before. Making a simple comparison between the quality of service and its prices under the old and new systems reveals that the SFI is cheaper and, to some extent, faster. Accordingly, as a user I prefer the SFI over the old system. When I use the internet today I am sure that my connection will not expire in the middle of my work.

I would have rejected the SFI system if the ISPs provided good service with good incentives since only then would the SFI end competition and hinder the development of internet in Palestine. Providing better internet connection by bypassing the ISPs is, from a user perspective, a good thing to do. Users have not felt the difference because the ISPs did not provide a variety of services or incentives to their subscribers. If we want to reconsider the SFI, we must force the ISPs to provide better internet services with competitive prices and incentives.

From an economic point of view, telecommunication is a vital economic sector and the MTIT's main concern, as stipulated in the Telecommunication Law, is how to develop telecommunications in Palestine and keep them up-to-date with the modern technology. The PA has seen that an exclusive license is the best way to achieve the above goals. The consequences of this exclusive license are that, on the one hand, Paltel has built relatively modern telephone and mobile telecommunication systems from scratch. On the other hand, Paltel has provoked a debate: is the LA the best way to develop the telecommunication sector in Palestine, or should the PA have left it to market forces and competition to develop telecommunications? The internet case above is a good example of this dilemma.

4.3. Obstacles

The main obstacles that hinder the development of the Palestinian telecommunications sector can be divided to internal and external obstacles. The internal obstacles can be summarized under the following:

1. The Telecommunication Law did not respond to the international best telecommunication practices and thus must be revised.
2. The MTIT has not had the qualified legal and technical teams to follow up the implementation of the Telecommunication Law.
3. The absence of an independent Telecommunication Regulatory Authority responsible for the regulation of the telecommunication sector is affecting the reputation of the whole system.
4. Paltel is not complying with the conditions and rules of the LA in developing the telecommunication sector and is not providing all the agreed services.

Meanwhile, the external obstacles are mainly derived from the continuing occupation of the WBGS and the unfair provisions of the Oslo Agreement. These obstacles can be summarized as follows:

1. Occupation of land and continual control over the Palestinian frequency spectrum.
2. Prevention of importing and releasing goods and equipment destined to develop the information technology and telecommunications networks.
3. Israel's refusal to allow the linking the occupied areas of Jerusalem to the Palestinian network. This prevents the separation of the Palestinian network from the Israeli one.
4. Despite signed accords with Israel as well as the resolutions and recommendations of the ITU to designate the Palestinian country code 970, Israel still prevents direct access to the international network.

5. In 1999 an accord was signed with the Hashemite Kingdom of Jordan and the Arab Republic of Egypt on a project to connect Palestine to the outside world via a fiber optics network. This, however, was denied by Israel.
6. Israel adopted the 7-digit mobile telephony while blocking the delivery of the necessary equipment that would facilitate Palestine's right to such a change. Furthermore, Israel has for the last eight months deliberately hindered the delivery of new equipment desperately needed by Jawwal for the expansion of the company's network and the development of its services.

5. Conclusion

The telecommunications sector in Palestine has come a long way since 1995. The Oslo Agreement gave the PA the right to build, manage, operate and regulate telecommunication networks in Palestine. In its path to state-building the PA has established the MTIT and enacted the Telecommunication Law No. 3 of 1996, which allowed the PA to mandate private companies to exploit the telecommunication sector. The PA has exclusively mandated Paltel to establish, operate and manage wired and wireless telecommunications in Palestine. Paltel has managed to build a devastated Palestinian telecommunications sector out of nothing, and has managed in a relatively short period of time to connect most of the Palestinian territories in a modern wired and mobile telecommunication network. On the other hand, Paltel's exclusive right over the telecommunications sector has put some constraints on the development of telecommunications. A simple comparison between the telecommunication sector in Jordan, where competition is high, and that in Palestine is enough to prove that Palestine is lagging behind.

In the absence of competition, which is the best way to develop the quality, prices and telecommunication services as a whole, the MTIT must work closely with Paltel in order to guarantee the good implementation of the LA in a manner consistent with the best technologies and practices. In this regard, and for lack of legal and technical expertise, the MTIT has not been doing well. For many reasons, Paltel is not complying with the conditions of the LA, and the MTIT is in no mood to terminate the LA because the current circumstances neither encourage nor help the PA to offer a new bid on telecommunication. For example, the MTIT has not offered a bid on mobile telecommunication services, even though Jawwal's exclusive license expired long ago. Recognizing this fact, Paltel (Jawwal) has been acting as the sole legitimate owner of the Palestinian telecommunications sector. Therefore, the MTIT must – as soon as possible – break Jawwal's monopoly on mobile telecommunication services by finding a way to license another company to work in Palestine. Moreover, the PA must renegotiate the terms and conditions stipulated in Article 36 of the Oslo Agreement in order to guarantee Palestinian full control over international and national telecommunications.

Finally, we would like to re-emphasize the importance of international community support for the total and unequivocal acquisition of Palestinian telecommunications rights, inclusive of its international gateway rights and its wired, wireless and satellite communications both regionally and internationally. We also call upon the international community to back our demand for Israel's immediate halt of control over the Palestinian telecommunications frequency spectrum, which is a national asset as well as a local need. The complete frequency spectrum should enable the Palestinian move towards building all communication and information networks so that all Palestinian society sectors, without exception, are connected. This will also help overcome present geographical barriers, including the apartheid separation wall and its consequent suffocating siege and strangle-hold of all forms of normal life and national development. In short, we demand of this distinguished international platform moves towards helping us in achieving total telecommunication and information society sector independence and recuperation of full Palestinian rights in accordance with the ITU's resolutions and recommendations. It is high time that the longest occupation in today's world is ended.

Higher Education in Palestine:

An Overview

(HEAP-MIS)

by

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Ottawa, Canada.

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Abstract

Higher education in Palestine grew under impossible conditions through the long years of occupation. Since the Palestinian Authority (PA) assumed civil administration of the education system in 1994, the education system has made great steps in order to catch up with the enormous development in education that took place over the last 20 years. One major development in the PA education system is the development of new curricula (replacing the Jordanian one) which is now covering grades 1-10 and will be completed in two years. The English language is now being taught starting in grade 1; new technology curricula will be introduced with the aim of motivating creativity and thinking in education rather than purely factual teaching; and for grades 11 and 12 the curricula will include information technology (IT) as a new subject to cover 60 contact hours of classes during the academic year.

During this same period, universities started to expand in terms of faculties, programs, enrollment, and infrastructure. A large number of IT related programs were initiated. The Ministry of Higher Education (MOHE) began to develop regulations and put together a strategy for organizing higher education. Evaluation criteria for new and existing programs are being implemented gradually.

In response to the Higher Education needs for a fully developed and integrated database system for all the academic programs in the institutions of higher education, Higher Education Academic Programs – Management Information System (HEAP-MIS) was developed with partial support from the International Development Research Centre in Ottawa. Currently the database includes most of the IT related study plans.

The ministry would like to use the system in its ongoing process of program accreditation. Now, the focus is on IT and Engineering programs. All study plans and courses for IT and Engineering will be implemented on the system by September of this year. A team is being set up by the ministry to start collecting and implementing all other programs. Further to this, the system will be further developed to include staff and research databases.

HEAP-MIS is web based, and has various access levels that allow different users to access the databases and generate reports. The system specifications for HEAP-MIS comprise the final section of this document.

Introduction

There are at present 11 Palestinian universities, all of which grant Bachelor and Master degrees. In addition, there are 11 colleges that grant two-year diplomas in a few specializations, such as nursing and computer related programs, and 11 technical universities and/or colleges that grant four-year diplomas in technical, business, and some other academic fields. Some of these colleges are affiliated with universities such as the Islamic University, Al-Azhar University in Gaza. The Anajah and Palestine Polytechnic Universities in the West Bank generally offer programs in traditional disciplines such as Science, Engineering, Literature, Business Administration, Education, Pharmacy, Medicine, and Hygiene. Unfortunately, higher education in general still lacks modern programs of study that meet the needs of the market and society at large. The available programs are limited in scope and applicability, which explains the very few contracts signed between universities and the private business community. Table 1 presents the distribution of institutions of higher education by type and location. Table 2 provides a list of all the institutions. (See Appendix 1.)

It is now recognized that information technology (IT) is a vital component of higher education and should have high priority in any development plans. IT-related programs are being started in almost every institution, mainly through the science engineering faculties. Recently, most of the universities started IT faculties. Table 3 provides a list of the institutions that have Computer and Information Technology related programs. (See Appendix 1.)

Unfortunately, however, at this point in time there is no concrete working plan to implement the necessary measures. The Ministry of Education did sponsor many IT conferences in collaboration with universities, and came forward with various recommendations to promote the utilization of IT. It has also invested a great deal of effort in setting up a communications network to facilitate information exchange and promote joint scientific research conducted by Palestinian universities. These plans, however, never materialized due to lack of funding and inadequate coordination between the universities concerned, and in some cases improper exploitation of the available resources.

University Colleges and Colleges

These colleges offer a combination of secondary technical and vocational training, which emphasizes the new technologies - more specifically IT. Aware of the importance of having a technically skilled workforce, the Ministry of Education, together with the Ministry of Labor, has worked out a national strategy to achieve this objective.

The strategy envisages the implementation of a flexible curriculum consisting of course modules designed to teach elementary and more advanced skills tailored to meet market needs. Educational programs can be completed by students in one year, but may extend up to four years of study, leading to a Bachelor Science degree in technology. After this, students may choose to continue their studies at the graduate level. Once again the objectives are (1) to supply the market with individual skills consistent with market demand, and (2) to offer students a variety of options.

Universities

Universities are currently in the process of redesigning their academic programs so as to include Computer Science courses. Most universities now require all students to be computer literate, and have introduced elective courses connected with computer applications. Students in the faculties of Science, Engineering, and Business Administration are free to take minor courses in Computer Science in order to give them some programming experience before graduation. Despite their limited resources, universities remain the leading centers for promoting the diffusion of ICT services to benefit the wider Palestinian community. In fact, every university is equipped with networking facilities open to all students and staff. In the following sections, we look at the various features that characterize higher education in Palestine.

The Structure of IT

The above-mentioned developments have contributed to raising the standard of performance of staff and students. Various departments are now equipped with computer laboratories.

Universities, by and large, recognize that they have a leading role to play in social and market development. University curricula have been designed so as to provide students with a reasonable measure of computer skills. Indeed, universities are making it mandatory for all students to take certain courses in computer science.

However, the ratio of the number of computers to the number of students remains low – one computer for 15 students at best in the general student population. Within specific departments, however, this ratio changes dramatically, reaching almost 1:1 in the case of classes in the Science and Engineering departments, and 1:5 in departments of Humanities. Similar figures apply to Internet users in the departments of Science and Humanities. All students and staff in Science departments use the Internet, whereas no more than 50 percent of staff and 80 percent of students in the Humanities departments use the Internet.

The quality and quantity of equipment found in institutions of higher education vary from place to place. Science departments are normally equipped with several laboratories, while most Humanities departments are equipped with a single laboratory. Most universities, however, are unable to provide the necessary technical and financial support for maintenance and system upgrading. The low ratio (1:15) of computers to students has meant that, in practice, each student has access to a computer for at least one hour a week, on the assumption that a computer is available five hours a day, five days in a week. But as computer laboratories stay open for eight hours a day, five days a week it follows that the available computer facilities are not sufficiently exploited. Incidentally, universities close down at 4 p.m. daily. Most Internet users use the system for E-correspondence, chatting, or simply as an information resource.

Academic Programs

As indicated in Table 3, there are various computer and information technology related programs offered by different faculties, both for the colleges and university-colleges. Most of the programs have similar content, although they are found under different names and faculties. None of the recently started faculties and/or programs is a result of a national strategy to develop human capacity. Academic IT programs, in general, are not market-oriented and therefore do not satisfy market needs.

Most of these IT departments offer programs that are, in terms of structure and content, Computer Science or Computer Engineering programs. The upshot has been the introduction of "traditional" Engineering programs under the guise of Information Technology programs. Clearly, this will not in itself produce trained IT professionals in the proper sense of the word.

The initial zeal shown in creating IT programs has not led to any changes in terms of quality or the number of qualified teaching staff. Notable exceptions are the Arab-American and Al-Quds universities, in Jenin and Jerusalem respectively.

Across higher education programs, in most cases the number of IT-related courses is relatively small, and only a limited number of students attend such courses. These courses are fundamentally replicas of traditional Computer Science or Computer Engineering courses. At the same time, the available resources are not fully exploited. By way of example, computer labs close at 3 p.m., while Internet services are not generally accessible to staff and students working at home.

University Curricula

Although many university courses are of high quality, there is an urgent need for modernization, notwithstanding the administrative difficulties that this entails. This challenge is common to all levels of the education system. Teaching methods tend to stress passive learning rather than proactive learning, which would encourage independent research. In addition, proficiency in the English language is generally low. Academic programs that are not directly related to Information Technology do not generally contain courses with any IT content. Furthermore, courses emphasizing applied computer skills are not properly integrated into the respective programs.

Academic Staff

Universities and colleges are currently suffering from a severe shortage of specialists (of masters or doctorate caliber) in Computer Science and Computer Engineering. In fact, the student:lecturer (PhD) ratio is at least 50:1, and 30:1 in the case of lecturers holding an MS or MA. The average number of students specializing in a given discipline annually is about 50. Although there are ample and accessible teaching aids, no more than 5 percent of lecturers appear to use them. The teaching staff, notwithstanding its high academic potential, have not had the opportunity to upgrade their skills and knowledge, which is a vital factor in developing university education. Most lecturers lack advanced training in IT, and only very few academics are involved in scientific research work.

Below is a summary of the main problems facing universities:

(a) Scarcity of specialists holding advanced degrees (PhDs) . Too few students/graduates who are able to get sponsorships to study abroad;
(b) Lack of consistent support for the IT industry;
(c) Severe shortage of funds to develop teachers' potential and know-how;
(d) Training in Applied Science is not geared to meet the practical needs of the community and the private sector; and
(e) Inflexible academic regulations that tend to be more concerned with procedural or financial matters than with incentives to encourage creativity and innovation.

State funding is generally inadequate, and some universities are not receiving the necessary financial support. Moreover universities have failed to invest in commercial enterprises to cut down their endemic deficits. What is needed is a practical policy to develop the more traditional sources of income by, for example, collaborating with the private business community.

APPENDIX 1

Table 1: Higher Education Institutions (type and location)

	Gaza					West Bank										
Type of Institution	Gaza	Rafah	Deir Al-Balah	Khan Yunis	Gaza Total	Ramallah	Birzeit	Bethlehem	Hebron	Nablus	Jenin	Tulkarem	Qalqilia	W/B Total	Jerusalem	Overall
U	3				3		1	1	2	1	1			6	1	10
U-C	1		1	2	4	3		1				1	1	6	1	11
C	3	1			4	4		2		4				13		20
Totals	7	1	1	2	11	7	1	4	5	5	1	1	1	25	5	41
Open U	Operate branches countrywide															1
																42

(U: Universities, U-C: University-Colleges, C: Colleges, Open U: Open University)

Table 2: Institutions of Higher Education by type and location

Type	No.	Name	Location
University	1	Hebron University	Hebron
	2	Birzeit University	Birzeit
	3	Bethlehem University	Bethlehem
	4	An- Najjah National University	Nablus
	5	The Islamic University at Gaza	Gaza
	6	Palestine Polytechnic University	Hebron
	7	Al-Quds University	Al-Quds
	8	Al-Aqsa University	Gaza
	9	Al-Azhar University	Gaza
	10	Arab-American University	Jenin
	11	Al-Quds Open University	Al-Quds
University College	1	Khadoury Palestine Technical College	Tulkarm
	2	Women's Community College	Ramallah
	3	Ramallah Community College	Ramallah
	4	Ibn Sina Nursing College	Ramallah
	5	Al-Da'wa Islamic College (Qalqilia)	Qalqilia
	6	Bethlehem Bible College	Bethlehem
	7	Khan Yunis College of Science and Technology	Khan Yunis
	8	Palestine Technical College (Deir Al Balah)	Deir Al Balah
	9	Al Da'wa Islamic College (Gaza)	Gaza
	10	Palestine Nursing College (Khan Yunis)	Khan Yunis
	11	Wajdi Abu Gharbieh Institute of Technology	Jerusalem
College	1	Talitha Kumi Community College	Bethlehem
	2	Palestine Technical College - Rammallah Women	Ramallah
	3	Gaza Community College – UNRWA	Gaza
	4	Hebron Nursing College	Hebron
	5	Al-Rawda College for Vocational Education	Nablus
	6	Palestine Polytechnic College	Hebron
	7	An-Najjah Community College	Nablus
	8	Al-Ummah college	Al-Quds
	9	Modern Community College	Ramallah
	10	Ibrahimieh Community College	Al-Quds
	11	School of Community Health	Ramallah
	12	Palestine Technical College - Al Arroub	Hebron
	13	Al-Azgar College	Gaza
	14	Insan Al Usra Nursing College	Ramallah
	15	CARITAS Nursing College	Bethlehem
	16	Islamic Community College of Applied Science and Technology	Gaza
	17	Arab Community College	Rafah
	18	Haja Andaleeb Al Amad Nursing College	Nablus
	19	Makassed Islamic Hospital Nursing College	Al-Quds
	20	Hisham Hijjawi College of Technology	Nablus

Table 3: List of institutions of higher education that have computer and IT programs

Type	Name	[Faculty] Program
University	Hebron University	[Science] Computer Science
	Birzeit University	[Science] Computer Science [Engineering] Computer Systems Engineering [Graduate Studies] Computational Science [Masters]
	Bethlehem University	[Science] Computer and Information Technology
	An- Najjah National University	[Science] Computational Mathematics [Masters] [Information Technology] Computer Science [Information Technology] Management Information Systems [Engineering] Computer Engineering
	The Islamic University at Gaza	[Science] Computer Science [Information Technology] Information Technology [Education] Educational Computer [Engineering] Computer Engineering
	Palestine Polytechnic University	[Engineering and Technology] Computer System Engineering [Administrative Sciences and Informatics] Information Systems [Administrative Sciences and Informatics] E-Marketing [Administrative Sciences and Informatics] Information Technology [Administrative Sciences and Informatics] Multimedia and Graphics [Applied Sciences] Computer Science
	Al-Quds University	[Science and Technology] Computer Science [Masters] [Science and Technology] Computer Science [Science and Technology] Management Information Systems [Science and Technology] Communication Networks [Science and Technology] Electronic Commerce [Science and Technology] Computer Technology [Science and Technology] Software Usability [Science and Technology] Multimedia Data and Knowledge Management [Engineering] Electronics and Computer Engineering [Masters] [Engineering] Computer Engineering
	Al-Aqsa University	[Applied Sciences] Computer , Computer Teacher
	Al-Azhar University	[Computer and Information Technology] Computer Science [Computer and Information Technology] Business Information Systems
	Arab-American University	[Information Technology] Computer Science

		[Information Technology] Computer Information Technology [Information Technology] Telecommunication Technology [Information Technology] Multimedia Technology [Administrative and Financial Sciences] Management Information Systems
	Al-Quds Open University	[Technology and Applied Sciences] Computing Information Systems [Technology and Applied Sciences] Information technology and Communication
University College	Khadoury Palestine Technical College	Communication Engineering Technology
	Women's Community College	Mathematics and Computer Software and Databases
	Ramallah Community College	Mathematics and Computer Software and Databases
	Khan Yunis College of Science and Technology	Software and Databases Computer networks and Internet
	Palestine Technical College (Deir Al Balah)	Wireless and non-wireless networks Technology by Computer Software and Databases
	Al Da'wa Islamic College (Gaza)	
	Wajdi Abu Gharbieh Institute of Technology	Information Technology
College	Palestine Technical College - Rammallah Women	Software and Databases
	Gaza Community College – UNRWA	Software and Databases
	Al-Rawda College for Vocational Education	Software and Databases
	Palestine Polytechnic College	
	An-Najjah National Community College	Software and Databases
	Al-Ummah college	Software and Databases
	Ibrahimieh Community College	Software and Databases
	Palestine Technical College - Al Arroub	Software and Databases
	Al-Azgar College	Electronic Computer Software and Databases
	Islamic Community College of Applied Science and Technology	Software and Databases
	Arab Community College	Software and Databases
	Hisham Hijjawi College of Technology	Software and Databases

Development of System Specifications for Higher Education Academic Programs

(HEAP-MIS)

by

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System Tables (see Appendix 2)

Table Number	Table Name
Table 1.	Join Form
Table 2.	System Login
Table 3.	System Logout
Table 4.	Adding New Accounts
Table 5.	Deleting Existing Accounts
Table 6.	Modifying Account Details
Table 7.	View Account Details
Table 8.	View Store Course
Table 9.	Add New Course
Table 10.	Delete Course
Table 11.	Update Course
Table 12.	Manage Replicated Course
Table 13.	Add New Address
Table 14.	Delete Institution Profile
Table 15.	Update Institution Profile
Table 16.	Update Account Password
Table 17.	Content Search
Table 18.	View Plan
Table 19.	Add New Plan
Table 20.	Update Plan
Table 21.	Delete Plan
Table 22.	Set the Institution Hierarchy
Table 23.	Add New College (Faculty)
Table 24.	Add New Program
Table 25.	Authenticate a New Track Degree
Table 26.	Request for New College
Table 27.	Request for New Program
Table 28.	Request for New Track
Table 29.	Request for New Track Degree
Table 30.	Update College
Table 31.	Update Program
Table 32.	Update Track
Table 33.	Delete College
Table 34.	Delete Program
Table 35.	Delete Track
Table 36.	Stop College
Table 37.	Stop Program
Table 38.	Stop Track
Table 39.	View Institution Course
Table 40.	Add New Course
Table 41.	Delete Course
Table 42.	Edit Course Details

1. Introduction

This System Requirement Specification (SRS) is developed to describe and explain the requirements for both the designer and programmer and to supply them with all details and constraints that affect the system requirements.

The SRS is described in to the following sections:

- Purpose and Intended Audience
- Scope of Product
- Definitions, Acronyms, and Abbreviations
- References
- Overview

1.1. Purpose and Intended Audience

- Detailed explanation and description of the system
- Well organized in determining the user requirements
- Provides the designer with enough details to understand the system for accurate implementation
- Determines all constraint and all limitations in the system
- Helps simplify the development process
- Satisfies the system functionality, and authentications for the designers and programmer
- Helps test and evaluate system functionality

1.2. Scope of Product

This section describes the scope of SRS:

- Identify the software product
- What the software product will do
- Objectives and goals

1.2.1. Identify the software products

The developed system will help create a database for the academic programs offered by the institutions of higher education in Palestine. Currently, there is no single unified database of academic programs that can be used to give a comprehensive view on higher education in Palestine. It is difficult – if not impossible – to generate accurate reports or statistics on the type of programs or courses offered, taking in consideration all the academic programs.

The system will provide different levels of access through the web to researchers, institutions, and the ministry to read, update, modify, or add courses, programs, institutions, etc. It will also be capable of generating a variety of customized reports. Access rights protocol is being considered to guarantee the accuracy and consistency of the database.

1.2.2. What the software product will do

- Produce a variety of reports on academic programs
- Provide levels of secure access to users
- Provide customizable interfaces
- Provide assurances of data accuracy and integrity
- Keep track of the information provided by the institutions
  (Each institution will be able to manage its information and is responsible for complying with the ministry general guidelines and bylaws for academic programs.)
- Enable the institutions to read/update/add their data in coordination with those maintaining the system on behalf of the Ministry of Higher Education
- Keep track of any change in the institution policy and academic lows provided in the system
- Help the ministry track program accreditation and development
- Allow the ministry to generate comparative reports and studies for purpose of planning and development
  (A unified database will enforce common standards or frameworks on higher education in general.)
- Help educators standardize faculty/program titles and course offerings (i.e., when programs are similar or identical but differ in names and titles due to lack of planning in starting new but replicated programs)

1.2.3. Objectives and goals

The main aim of this system is to automate the collection of information of all academic programs by:

- Creating a unified database and a comprehensive management information system for academic programs across higher education institutions.
- Tracking all information about institutions, programs, courses, and study plans.
- Applying ministry guidelines and bylaws when possible to the academic programs to preserve credibility.

- Giving an overview of each institution academic system (courses, tracks,
  degrees, etc.).
- Simplifying the search process on any attribute of the academic programs.
- Producing standard and customized reports.
- Filtering the given courses according to tracks plan.
- Filtering the given degree names from different institutions on the same topics.
- Facilitating the updating of data.
- Protecting the data from forgery.
- Allowing the ministry to cope with and keep up with new institutions.
- Generating study plans, including majors/minors/tracks, etc.
- Guaranteeing the privileges and privacy for all users through their positions.
- Completing one step to converting the manual system to a automated system.
- Help higher education institutions manipulate and manage some aspects of academic programs.

1.3. Definitions, Acronyms, and Abbreviations

1.3.1. Definitions

Word	Definition
Institution	Institute of higher education which is responsible for educating students after a secondary degree; it may be one of several different entities, including university, university-college, or college.
University	A large and diverse institution of higher education created to educate for life. It consists of several faculties.
University College	An institution of higher education created to educate and grant four-year diplomas.
College	An institution of higher education created to educate and grant two-year diplomas.
Program	A specialization within a college which may have many tracks.
Track	A concentration field of study within a program.
Degree	Award of completion of a program of study (Bachelors, Masters, Doctorate).
Study Plan	A plan that students follow to complete a program of study.
Plan Courses	A list of courses for a given study plan.
Requirements	The several types of requirements (i.e., university, faculty, program).

Specialty Type	The track allowing students to obtain a full major (single) or a major and minor in different programs.
Institution Course	A course chosen by the institution from the course options; depends on academic plan.
Store Course	A list of all unique courses in all institutions of higher learning.
Prerequisite	Indication of sequence of courses.
University Requirement	Obligatory courses for all students in the university.
University Elective	Elective course in the university (students select a number of courses from a list of defined courses).
Faculty Requirement	Obligatory courses for all students in a faculty.
College Elective	Elective course in a faculty (students select a number of courses from a list of defined courses).
Department Requirement	Obligatory courses for all students in a department.
Department Elective	Elective course in a department (students select a number of courses from a list of defined courses).
Program Elective	Elective course in a program (students select a number of courses from a list of defined courses).
Program Requirement	Obligatory courses for all students in a program.
Track Elective	Elective course in a track (students select a number of courses from a list of defined courses).
Track Requirement	Obligatory courses for all students in a track.
Free Elective	Free courses that students may select.
Concentration Elective	Obligatory courses that students must take as constrained courses.
Concentration Requirement	Obligatory courses selected to concentrate in a field of study.
Browser	A client software program used for searching and viewing/browsing various kinds of Internet resources such as information on web sites.
Course Outline	View all subjects in a course.

1.3.2. Acronyms

LAN	Local Area Network
WAN	Wide Area Network
HEAPS	Higher Education Academic Programs System
DBMS	Database Management System
SRS	System Requirement Specification
BA	Bachelor of Arts Degree

WWW	Wide World Web

1.4. References

- Software Engineering (the production of quality software), second edition, Shari Lawrence.
- System analysis document.
- IEEE Recommended Practice for software requirement specifications.
- Educational institution website.
- Student Guide on the Al-Quds University.
- Outline of many educational institutions.
- The Ministry of Higher Educational site and reports.

2. General Description

This section will help the designer and programmers to get a detailed understanding of the system.

2.1. Product Perspective

The system is a database web application. It provides trusted users who have an active account (i.e., ministry administrators and users, institutional representatives, etc.) to access the system control desktop and to enter specific data. Other users can retrieve the data according to pre-defined reports that answer their questions about any issue at any institution.

There are three types of users:

- Administrator: responsible for management, setup, time-tabling, backup, and performance of the system and database.
- Developer: responsible for database and MIS development.
- Ministry Administrator: responsible for authentication, control, acceptance of the information entered by the institution administrator.
- Institution administrator: responsible for setup and identification of academic programs' study plans according to the university hierarchy.

In this section we will describe the following points by taking into consideration that this system is totally self-contained:

- System interfaces
- User interfaces
- Hardware interfaces
- Software interfaces
- Communications interfaces
- Memory constraints
- Operations

2.1.1. System interfaces

The system will be built using the Macromedia package, Adobe collection, JavaScript, and PHP editors. These tools will support the system with suitable development interfaces.

Tools supported functions:

- Security and privilege of system users
- Backup and recovery
- Easy Development Environment

2.1.2. User Interfaces

Since several types of users (as outlined in section 3.2) will be allowed to use the system resources, different interface will be supported according the user type.

Two main types of interfaces will be supported for system users:

- Administrative interface
- End user interface

The administrative interface is restricted, and so only the trusted user can access it. This will provide customized control desktop in which the system function can be activated according to user position.

The end user interface will support an easy flow to browse information that helps users reach their target information. Both interfaces are supported by helpful tools and guidelines to guarantee system usability and functionality.

2.1.3. Hardware interfaces

- Server (computable/brand name is recommended)
- Backup media will store data of the database in external storage media to use it once needed

2.1.4. Software interfaces

- Server OS (Windows 2000 server)
- Oracle server
- Back-up program
- Apache 2 server

2.1.5. Communication interfaces

The system is a web based application so it can be accessed from anywhere in the world.

2.1.6. Memory constraints

Based on the hardware interface the following specification is recommended:

- 128MB RAM
- 20GB Hard Disk capacity
- Writable CD-ROM to store data , or backup media
- Magic card to retrieve data in case of system failure

2.1.7. Operations

The desired operations by the user will include the following transactions:

- Enable entering data in a flexible and correct way.
- Make searches with minimum time.
- Since data are crucial, it is better to use system recovery or backup to save it as much as possible.
- User operations have to produce the correct results.
- Since more than one type of user is expected to access the system, an access protocol will be developed depending on the user type.

2.2. Product Functions

The list below shows the summarized system functions;

- Information Handling
- System Login/Logout
- System Accounts
- Accounts Management
- Store Course Management
- Institution Profile
- Searching
- Plan Management
- Manage Institution Hierarchy (structure of the institution):
  - University
    - College (faculty)
      - Program / Department
        - Track
  - Community College / Technical College
    - Program / Department
      - Track
  - Institutes
    - Program / Department
      - Track

- Institution Course Management
- Generate Reports
- Event Registry

For detailed descriptions of the requirements, see Chapter 3.

2.3. User Characteristics

System users types:

- Top Level Management
- Higher Administrator
- Administrative Staff
- Students and Internet Users

All the intended users of the system are assumed to have at least general knowledge of using standard WWW browser, including Internet Explorer and Netscape programs.

For the purpose of this document, these users are further categorized into the following user groups:

- Level 0 Users: System Administrators
- Level 1 Users: Ministry Administrators
- Level 2 Users: Events Users
- Level 3 Users: Basic Users

The first three levels of users have their own Access Level, in which the System Account will be described.

2.4. General Constraints

- Regulatory policy: each institution has its own hierarchy in which courses and plans for each track will be set.
- The ministry is responsible to accept new institutions, and tracks and colleges for each institution.
- No need for a hardware limitation in use.
- The system works as a stand-alone application.
- Each function (as described in section 2.2) is controlled according to product function.
- The requirements of the system are reliable.
- The system language requirement has a higher order, in a technical point of view, to be accepted by the designers.

- The security system is set up to allow the trusted users to have an active account to access the system resources.
- Each institution has its own hierarchy for the college (as a separate institution). The top level type on the hierarchy is community college or technical college, but for the college (faculty), the top level type is university
  and the college (faculty) is the second level on it. Thus, for the institutions the level on the hierarchy decides the institution type.

2.5. Apportioning of Requirements

The system is implemented to cover the current stage with all its functions and needs, so it can be developed in the future to cover more features as follows:

- Developed to be desktop application.
- Developed to remove replication and duplication of courses from the store course.

3. Specific Requirements

3.1. External Interface Requirements

This chapter describes the specific requirements of the software product. This includes functional requirements (ranked as core, desirable or optional), function descriptions, non-functional requirements, external interface requirements, performance requirements, design constraints, and software system attributes.

3.1.1. User interfaces

As described in user characteristics (section 2.3) the system deals with the following user classes:

- Top Level Management
- Higher Administrator
- Administrative Staff
- Students and Internet Users

3.1.2. Hardware interfaces

The server based on x86-compatible computers as described in section 2.1.3.

3.1.3. Software interfaces

The generated web pages will be compatible with HTML 4.0 standards.

Server side

The server's application will be run under Windows 2000 or Linux based platform. Required software packages include:

- HTTP Server software(Apache2)
- ORACLE database software(Oracle8i)
- Server-Side scripting software (PHP4)

Client side

A web browser is the only application a client needs to access the system; this software is freely distributed by the known operating systems (Windows 98/2000/XP).

3.1.4. Communications interfaces

HEAPS operates over the Internet, so TCP/IP will be the base protocol that is used to access the server by the Internet clients.

3.2. Behavioral Requirements

3.2.1. Same class of user

Level 0 users will be either developers or programmers of the system who are responsible for system backup and maintenance.

Other User levels will assigned to the pre-defined responsibilities.

3.2.2. Related real-world objects

There are no related real-word objects, but the system can be considered as a collection of the institution websites under the ministry rules.

3.2.3. Functional requirements

Three different rankings of functional requirements are implemented in the system: core, desirable and optional. Each function will be given a name, description, ranking, its accessibility, and a short comment (if applicable). The supplied information will be considered incomplete if the core requirements are not fulfilled as they form the basic foundation of the system. Desirable requirements are a secondary ranking which are considered add-ons to the basic functionalities of the system; they aim to enhance the system's performance. Optional requirements will only be implemented when the core and desirable requirements are complete.

3.2.3.1. Information handling

Information handling is a core requirement. There will be six categories of information that flow in the system. Moreover, this information can be viewed and processed by users. The categories are:

1. General Information: shown to users when they are searching or browsing for an institution. It contains:

   - Institution Name
   - Phone Number
   - Website
   - Email Address
   - Addresses
   - Type
   - Any other available information that describes the institution

2. Specific Information: hierarchy information of institution, including:

   - The colleges of the institution (name, descriptions, number) if applicable.

- Programs of the institution (name, descriptions, number)
- Details of tracks for the degree with details (name, descriptions, and number).

3. Institution Plan Information: information about the plan and courses in the plan to each track of the institution. This includes:

   - Plan number and type.
   - Course number and detail.
   - Course type on the plan.
   - Plan Type (full major (single), major, minor).

4. Associated course: all information regarding the selected institution course from the Store Course. This information is related to the store course requirement and includes:

   - Reference number for the course from the store course.
   - Suggested number and name for the course by institution.
   - Prerequisites course list for each course.
   - Course description.
   - Course type (course, lab, training, etc.).
   - Course owner (the program that is responsible for defining and managing the course).
   - Associated Course related to the course plan.

5. Store Course: contains all courses and includes the following:

   - Course Store Number
   - Course name
   - Course identifiers (keywords describe the course)

6. User Account Information: contains the authentications and access privileges:

   - User Access Level
   - User Name
   - Password
   - HEAPS Name

3.2.3.2. System accounts

Four different levels of users are allowed:

1. Level 0 users: System Administrators

Users of this level are granted full access permission. Moreover, permission to back up, maintain, and develop the new system function is granted.

2. Level 1 users: Ministry Administrators

Users of this level will be granted permission to:

- Login/Logout
- Add/Delete/Edit/View all General Information
- Add/Delete/Edit/View all User Account Information
- Add/Delete/Edit/View all Store Course Information
- Add/Delete/Edit/View Available Degrees for each track on each institution
- Add/View all specific information about each institution
- Add/Edit events and activities
- Edit/Delete feedback

3. Level 2 users: Institution Users

Users of this level will be granted permission to:

- Login/Logout
- Edit/View Self General Information of institution
- View all Store Course Information
- View all hierarchy information
- Add details and description for the tracks and degree
- Manage courses of the institution according to the ministry courses
- Manage the plane course for institution
- Edit the special information of institution

*Note: The course of any institution will have a specific reference ID that will be used to define the courses for the ministry, and so each institution can edit the course profile details such as the course name, number, level and prerequisite.

• Each institution is fully responsible to manage its plan through the institution administrator. The plan must show its type, and course type should refer to program tracks and degree.

4. Level 3 users: Basic Users

Users of this level will be granted permission to:

- View all institution information
- View all institution plan course information
- Search and browse all available reports

3.2.3.3. Institutional Hierarchy:

Every institution has its hierarchal management according to the institution type as follows:

University:

- o Each university has many colleges.
- o Every college has one or more programs.
- o Each program has a specific degree.
- o Each program has one or more tracks.

College:

- o Every college has one or more programs.
- o Each program has one or more tracks.

Institute:

- o Every institute has one or more programs.
- o Each program has one or more tracks.

3.2.3.4 Manage institutional plan

Each institution can insert/add/modify/delete and publish its course plan, taking into consideration:

- The prerequisites for each course
- Specialized type
- The prerequisite courses for each track
- The course requirements
- Plan year and type
- Each track for a specific degree will set one or more plan (different type) for the same year depend on the type of specialization
- The plan contains the following parts :
    - University Requirement
    - University Elective
    - Faculty Requirement
    - Faculty Elective
    - Program Requirement
    - Program Elective
    - Track Requirement
    - Track Elective
    - Department Requirement
    - Department Elective
    - Free Elective.
    - Support Requirement
    - Concentration Requirement

- Concentration Elective

The types of plan are:

- Single plan (full major)
- Major plan
- Minor plan.

3.2.3.5 Manage course

The system will store all information about the course that the institution assigned to apply to its plan, such as:

- Course name
- Course number
- Course type
- Course descriptions
- The program that owns the course
- The course equivalent
- The course prerequisites

3.2.3.6 Manage institutional course

The system will archive the courses of each institution; these courses will be entered to the system by the institution administrator by choosing from the available institution course lists that depend on the course store (the collection of all courses taught on the institutions to be listed when the institution determines to choose it in teaching the course on it). It will be used to organize and remove replicate courses.

Each course has specific reference to a course in store course. The institution will be able to set the course name and description to use on its plan. The course will be classified on a program.

3.3. Functions Description

This section emphasizes the functions/actions that users can take in the system. All functions are described more fully in tables to be found in the Appendix 2.

3.3.1. System Login/Logout

This feature allows users to enter and leave the system. (See Tables 2 and 3.)

New account package:

The institution needs to contact the administrator and provide him with basic information to join the system. The administrator will check this information and reply with the link of joint form and temporary user name and password. (See Table 1.)

3.3.2. Account Management

This feature allows users to manage their own user details. Also, it allows the administrator to manage all the user accounts in the system. This feature consists of the following functions: (see Tables 4 through 7)

- Adding New Accounts
- Deleting Existing Accounts
- Modifying Account Details
- View Account Details

3.3.3. Store Course Management

These functions will organize all available courses of all higher education institutions to revoke the replication and to satisfy a standard description for each course. (See Tables 8 through 12.)

- View Store Course
- Add New Course
- Delete Course
- Update Course
- Managed Replicated Courses

3.3.4. Institution profile

The institution can edit most of the information on its profile through the institution administrator; this data will be used to give an overview for the institution. (See Tables 13 through 16.)

- Add New Address
- Delete Institution Profile
- Update Institution Profile
- Update Account Password

3.3.5. Searching

The search process must always reach the information in an easier and faster way since the system contains a huge amount of data. (See Table 17.)

3.3.6. Plan management

This set of functions will be used to define and prepare the tracks plan. (See Tables 18 through 21.)

- View Plan
- Add New Plan
- Update Plan
- Delete Plan

3.3.7. Manage institution hierarchy

As described above, each institution has its own hierarchy depending on its type.

(See Tables 22 through 38.)

3.3.8. Institution course management
To manage and organize the institution list course the following set of functions will be used: (see Tables 39 through 43)
- View Institution Course
- Add New Course
- Delete Course
- Edit Course Details
- Update Course

3.3.9. Generate reports
One of the benefits behind this site is to view collected institution information in an easy and professional way. (See Tables 44 through 48.)
- Institution Hierarchy Reports
- Plans Reports
- Courses Reports
- Track Degrees Reports
- General Reports

3.3.10. Event Registry
As the system has more than one user and all of them access the system resources, each user event has to be registered into the event registry database for security purposes. (See Tables 49 through 51.)

3.4. Non-behavioral Requirements

3.4.1. Performance requirements
This section describes the performance requirements of the product. It specifies the static and dynamic numerical requirements that guarantee system performance.

3.4.2. Qualitative requirements
This section of the SRS and describes the quality aspects of the system, which include:

3.4.2.1. Availability

Apart from updating the system, or any technical difficulty and down-time, the system will be available at all times (24 hours) for users with correct hardware, software, and communication interfaces.

3.4.2.2. Security

The security issues are addressed during the development of the system, in order to prevent unauthorized access, and ensure the safety of the database and accounts.

1. Login: Users must be authenticated by providing the correct username and password before entering the system. The users can only log in once at a time; no multiple login is allowed by using the same username.
2. Logout: Users can logout by clicking on logout button or by closing the browser. There is also an automatic timeout if the session is idle for 20 minutes.

3.4.2.3. Portability

The system can run on more than one machine.

3.4.3. Design and implementation constraints

This section describes constraints that may affect the development of the system.

3.4.3.1. Platform constraints

The server side software will be able to run under a Windows or UNIX compatible operating system, such as Linux.

3.4.3.2. Client and server software constraints

The client side software should only interface with the web browser. Users are not required to install any additional software or components to operate the system. The server software requires back end database. The language to be adopted by the system has to be compatible to the operating system.

3.5. Other Requirements

3.5.1. Database

The system will use the database source which will be stored about the institutions, courses, and plans. The main entities in the system will be as follow:

1. HEAPS
2. College
3. Program
4. Degree
5. Tracks
6. Plan
7. Institution Course
8. Store Course

3.5.2. Error handling

The system will check all user inputs to the system to ensure that all the fields provided are within bounds and correct. In case of error concerning user related input, an error message will be displayed to the user.

APPENDIX 2

Table 1: Join Form

Function Name	Join Form
Function Description	Allow users to create and satisfy the basic profile.
Function Ranking	Core
Function Accessibility	Level 1, 2
Comment	After the institution gets the temporary user account from the administrator, step two is to use this temporary account to access the join form, which creates a basic profile (real user account, password and some other information). After filing in the information, the administrator checks it to activate the profile, which will be used in the feature by the institution user account.

Table 2: System Login

Function Name	System Login
Function Description	Allows users to enter the system.
Function Ranking	Core
Function Accessibility	Level 1, 2
Comment	A valid username and password is needed for authentication. This will correspond to the database and guarantee the data security and level of system access.

Table 3: System Logout

Function Name	System Logout
Function Description	Allows users to exit the system.
Function Ranking	Core
Function Accessibility	Level 1, 2
Comment	After exiting the system users have to login again in order to access the system. The system supports session timeout (i.e., if any active user accounts are left idle for 20 minutes, the system automatically logs the user out).

Table 4: Adding New Accounts

Function Name	Adding New Accounts
Function Description	Allows the administrator to add new accounts to the system.
Function Ranking	Core
Function Accessibility	Level 1
Comment	The following information is required upon the addition of a new account: 1. General Information 2. Account Information

Table 5: Deleting Existing Accounts

Function Name	Deleting Existing Accounts
Function Description	Allows the administrator to delete accounts from the system.
Function Ranking	Core
Function Accessibility	Level 1
Comment	When a user account is deleted, the account will be completely removed from the system's database.

Table 6: Modifying Account Details

Function Name	Modifying Account Details
Function Description	Allows users to modify the details of their accounts.
Function Ranking	Core
Function Accessibility	Level 1, 2
Comment	General Information and Account Information can be edited. Note: Level 2 users can only change General Information of their own accounts. Level 1 users can change all the information.

Table 7: View Account Details

Function Name	View Account Details
Function Description	Allows administrator to view the content of users' accounts.
Function Ranking	Core
Function Accessibility	Level 1
Comment	Presents General Information and Account Information. Note: Level 2 users can only view General Information of their own accounts. Level 1 users can view all the information of any selected account.

Table 8: View Store Course

Function Name	System Login
Function Description	Allows the users to view all the available courses in the store.
Function Ranking	Core
Function Accessibility	Level 1, 2
Comment	The user can view all the courses in the store course list.

Table 9: Add New Course

Function Name	Add New Course
Function Description	Allows the user to add a course to the store course list.
Function Ranking	Core
Function Accessibility	Level 1
Comment	Each institution has to send its courses to the ministry administrator. The administrator will add them to the store course according the unique course name, course identifiers, and unique number as set by the administrator.

Table 10: Delete Course

Function Name	Delete Course
Function Description	Deletes a course from the store course list.
Function Ranking	Core
Function Accessibility	Level 1
Comment	Courses can be deleted if the course is not related to the institution course list.

Table 11: Update Course

Function Name	Update Course
Function Description	Administrator can change the course information inside the store.
Function Ranking	Core
Function Accessibility	Level 1
Comment	The course number/name is needed to update a course. When updating a course ID, all related courses in the institution will be affected.

Table 12: Manage Replicated Courses

Function Name	Manage Replicated Courses
Function Description	Control the courses list to eliminate the replicated courses.
Function Ranking	Desirable
Function Accessibility	Level 1
Comment	When the administrator decides that two or more courses are the same, he will determine which ones to keep. The system automatically deletes the course as chosen by the administrator, updates the associated course, and sets the references to the one kept.

Table 13: Add New Address

Function Name	Add New Address
Function Description	Insert and save an address inside the addresses table.
Function Ranking	Core
Function Accessibility	Level 2
Comment	No comment.

Table 14: Delete Institution Profile

Function Name	Delete Institution Profile
Function Description	Deletes the institution profile.
Function Ranking	Core
Function Accessibility	Level 1, 2
Comment	When the transaction has been saved, the institution status will be inactive and it will be activated only with the ministry's agreement.

Table 15: Update Institution Profile

Function Name	Update Institution Profile
Function Description	Changes the data related to the profile of the institution.
Function Ranking	Core
Function Accessibility	Level 1, 2
Comment	Level 1 users can change all the information about the institution. Level 2 users can only change the address.

Table 16: Update Account Password

Function Name	Update Account Password
Function Description	Change old password to new password
Function Ranking	Optional
Function Accessibility	Level 2
Comment	No comment.

Table 17: Content Search

Function Name	Content Search
Function Description	Allows the user to search for information within the database of the institutions.
Function Ranking	Core
Function Accessibility	All user levels
Comment	The user will determine the subject of the search from the following options: 1. Institutions 2. Plan (user has to insert the track and the institution) 3. Course Outline (user has to insert the track and the institution) 4. Tracks 5. Degrees (optional)

Table 18: View Plan

Function Name	View Plan
Function Description	Allows the user to see the institution plan for track.
Function Ranking	Core
Function Accessibility	All levels
Comment	Only the last plan for the institution track can be displayed.

Table 19: Add New Plan

Function Name	Add New Plan
Function Description	Creates a new plan course for the track for a specific institution.
Function Ranking	Core
Function Accessibility	Level 2
Comment	Inserted plan needs to define the plan type (major, single, or minor) and the tracks for the plan.

Table 20: Update Plan

Function Name	Update Plan
Function Description	Change the information on the institution plan.
Function Ranking	Core
Function Accessibility	Level 2
Comment	The institution may have more than one plan for the same track.

Table 21: Delete Plan

Function Name	Delete Plan
Function Description	Remove a track plan from an institution.
Function Ranking	Core
Function Accessibility	Level 2
Comment	The track must have at least one available plan. After deleting, all references for the deleted record (plan course list) will be deleted automatically.

Table 22: Set the Institution Hierarchy

Function Name	Set the Institution Hierarchy
Function Description	Allows the ministry administrator to set the hierarchy of a new institution.
Function Ranking	Core
Function Accessibility	Level 1
Comment	Level 1 user creates a record for the institution after receiving its contact information.

Table 23: Add New College

Function Name	Add New College
Function Description	Confirm a new college on institution.
Function Ranking	Desirable
Function Accessibility	Level 1
Comment	After the ministry receives the request to confirm new college, the ministry administrator will activate the record.

Table 24: Add New Program

Function Name	Add New Program
Function Description	Confirm new program for an institution.
Function Ranking	Desirable
Function Accessibility	Level 1
Comment	After the ministry receives the request for confirming a new program, the administrator will activate the record.

Table 25: Authenticate a New Track Degree

Function Name	Authenticate a New Track Degree
Function Description	Confirm a new degree on institution.
Function Ranking	Desirable
Function Accessibility	Level 1
Comment	After the ministry receives the request for confirming a new track, the administrator will activate the record.

Table 26: Request for a New College

Function Name	Request for a New College
Function Description	Feedback to inform the ministry to confirm a new college for the institution.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	The feedback will create a new record on the college's database with a status (new) until the ministry activates it.

Table 27: Request for a New Program

Function Name	Request for a New Program
Function Description	Feedback to inform the ministry to confirm a new program for an institution.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	The feedback will create a new record on the program database, and the status (new) program until the ministry activates it.

Table 28: Request for a New Track

Function Name	Request for a New Track
Function Description	Feedback to inform the ministry to confirm new track for an institution.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	The feedback will create a new record on the track dataset, and the status (new) track will be until the ministry activates it.

Table 29: Request for New Track Degree

Function Name	Request for New Track Degree
Function Description	Feedback to inform the ministry and request it to confirm a new degree, and available track on institution.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	The feedback will create a new record on the degree database, and the status (new) degree will be until the ministry activates it.

Table 30: Update College

Function Name	Update College
Function Description	Change the college information.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	The change will be limited to displaying the name and description.

Table 31: Update Program

Function Name	Update Program
Function Description	Change the program information.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	The change will be limited to displaying the name and description.

Table 32: Update Track

Function Name	Update Track
Function Description	Change the track information.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	The change will be limited to displaying the name and description.

Table 33: Delete College

Function Name	Delete College
Function Description	Eliminate the college record.
Function Ranking	Desirable
Function Accessibility	Level 1
Comment	This operation will be cascaded to all references.

Table 34: Delete Program

Function Name	Delete Program
Function Description	Eliminate the program record.
Function Ranking	Desirable
Function Accessibility	Level 1
Comment	This operation will be cascaded to all references.

Table 35: Delete Track

Function Name	Delete Track
Function Description	Eliminate the track record.
Function Ranking	Desirable
Function Accessibility	Level 1
Comment	This operation will be cascaded to all references.

Table 36: Stop College

Function Name	Stop College
Function Description	Set college status as inactive.
Function Ranking	Optional
Function Accessibility	Level 1, 2
Comment	The status of the college will be set to inactive.

Table 37: Stop Program

Function Name	Stop Program
Function Description	Set program status to inactive.
Function Ranking	Optional
Function Accessibility	Level 1, 2
Comment	The status of the program will be set to inactive.

Table 38: Stop Track

Function Name	Stop Track
Function Description	Set track status to inactive
Function Ranking	Optional
Function Accessibility	Level 1, 2
Comment	The status of the track will be set to inactive.

Table 39: Delete College

Function Name	View Institution Course
Function Description	List all courses available on the institution.
Function Ranking	Core
Function Accessibility	Level 1, 2
Comment	Level 1 users can view all institutions' lists. Level 2 users can only view the registered courses in their institutions.

Table 40: Add New Course

Function Name	Add New Course
Function Description	Add a course to the institution course list from the store course list.
Function Ranking	Core
Function Accessibility	Level 2
Comment	The course on the institution list has a unique identifier (course ID) and a reference key to the course on the store list. When users add a course, its name is required, which will be the same name of course on the institution.

Table 41: Delete Course

Function Name	Delete Course
Function Description	Eliminate a course from the institution course list.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	To delete a course the user needs to ensure that the course is not connected to any plan.

Table 42: Edit Course Details

Function Name	Edit Course Details
Function Description	Edit the course owner, type, description, and equivalent.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	The user of this level will determine which program to manage the course (to classify

Table 43: Update Course

Function Name	Update Course
Function Description	Change the course references and details on the store course.
Function Ranking	Desirable
Function Accessibility	Level 2
Comment	No comment.

Table 44: Institution Hierarchy Reports

Function Name	Institution Hierarchy Reports
Function Description	Generate reports for the institution hierarchy.
Function Ranking	Core
Function Accessibility	All levels
Comment	1. To generate reporting determine level. 2. Type reports.

Table 45: Plans Reports

Function Name	Plans Reports
Function Description	Generate reports for all plans used in the track.
Function Ranking	Core
Function Accessibility	All levels
Comment	To generate reports, determine: 1. The track code. 2. The track degree.

Table 46: Course Reports

Function Name	Course Reports
Function Description	Generate reports that describe courses, contents, and type.
Function Ranking	Core
Function Accessibility	All levels
Comment	The report will contain: 1. Description of the course. 2. Prerequisite of the course. 3. One program related to the course.

Table 47: Track Degrees Reports

Function Name	Track Degrees Reports
Function Description	View all degrees granted by track.
Function Ranking	Core
Function Accessibility	All levels.
Comment	Display general forms of the degree and references (track, program, faculty).

Table 48: General Reports

Function Name	General Reports
Function Description	Display general reports of institutions.
Function Ranking	Core
Function Accessibility	All levels
Comment	No comment.

Table 49: Register Events

Function Name	Register Events
Function Description	Register each action started by user login and logout.
Function Ranking	Core
Function Accessibility	Level 0
Comment	The following information will register: 1. User ID. 2. Date and time of event. 3. The file makes the event. 4. Function name. 5. The event result.

Table 50: View Events

Function Name	View Events
Function Description	Displays all events.
Function Ranking	Core
Function Accessibility	Level 0
Comment	No comment.

Table 51: Search Events

Function Name	Search Events
Function Description	Displays all events according to constraints.
Function Ranking	Optional
Function Accessibility	Level 0
Comment	The user can search according to the following parameters: 1. User access. 2. Event type. 3. Date and time.

Information and Communication Technology in the Middle East and North Africa Region
With Special Reference to Palestine
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